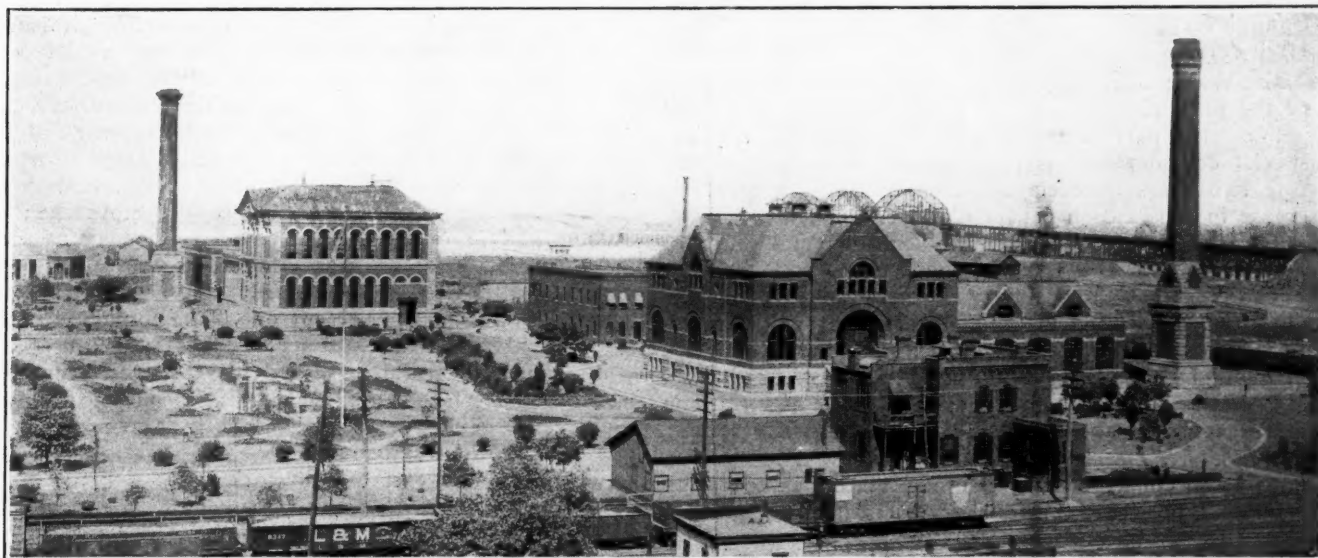


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No. 1



BISSELL'S POINT PUMPING STATION.

TO IMPROVE ST. LOUIS WATER WORKS.

Present Plant and Proposed Extension.—New Intake in Mississippi River and New Source of Supply from the Missouri.—Filter Plant.—Increase Meters and Revise Rates.

By HARRY M. CRUTCHER.

If the recommendations of water commissioner Edward E. Wall are carried out, St. Louis will extend its waterworks system, drawing a part of the supply directly from the Missouri river at a point several miles above the junction of that stream with the Mississippi.

At present the city draws only from the latter river and has but one intake which is located at the Chain of Rocks, 10½ miles above the business center of the city. Here are situated also the coagulant house and the settling basins.

The present daily capacity of the whole system is 120 million gallons. Mr. Wall believes the system should be enlarged to a working capacity of 150 million gallons daily and rehabilitated so that its life and usefulness shall be extended to suffice until at least 1935. Practically the entire population of St. Louis, estimated now at 710,000, is supplied with water by the works. The average daily pumping for the year ending April 1, 1912 was 83.6 million gallons.

In a recent report to the Board of Public Improvements, Mr. Wall submitted three possible solutions, but recommended the following course of action, which he regards the most economical and efficient and which he believes will result in the greatest satisfaction and benefit to the citizens of St. Louis:

1. Authorize the general installation of meters, to be completed not later than 1918; establish equitable meter rates and abolish all flat rates as fast as the territory is covered.

2. Build a new intake tower and tunnel at the Chain of Rocks to insure an ample supply of water at the lowest stage of the Mississippi river and under the worst conditions produced by extreme cold weather.

3. Build a filter plant at the Chain of Rocks and make necessary changes in the settling basins.

4. Make all necessary replacements and additions to bring the daily working capacity of the present plant up to 150 million gallons per day and for its continuous operation until 1950 or later.

5. Build new waterworks with a working capacity of 100 million gallons per day with an intake on the Missouri river and with reservoirs and filters, to be completed by 1935.

The present intake was completed in 1892. Its location is 5½ miles south of the mouth of the Missouri river. It is 1,500 feet east of the west bank of the river, standing on the west edge of the channel. Its foundation is on solid rock. Officials say the tower was parallel to the current when it was erected but changes in the Illinois shore of the river have caused the current to strike it at an angle of about fifteen degrees.

A tunnel connects the tower with the wet well. This tunnel is brick-lined, driven through rock. Pumps lift the water from the wet well to the delivery well, whence it flows to the basins after receiving a charge of chemicals. The coagulant plant is of sufficient capacity to supply chemicals for the treatment of 160 million gallons of water daily.

Two conduits carry the clarified water from the Chain of Rocks to the Baden pumping station, four miles south of the Chain. From Baden to Bissel's Point pumping station, three miles further south, there is one masonry conduit. The two pumping stations supply the high and low pressure districts of the city respectively.

The daily working capacities are summarized by commissioner Wall as follows:

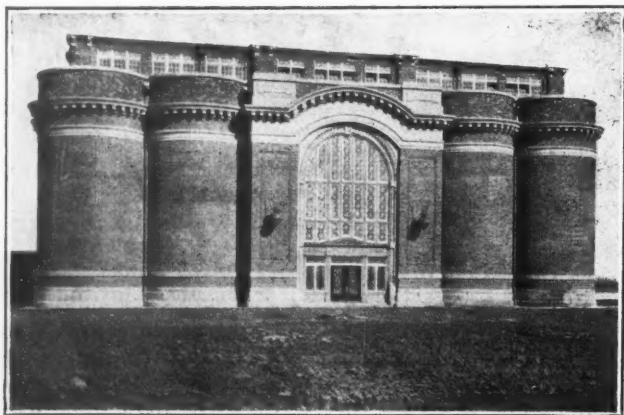
Intake	120,000,000 gallons.
Pumps at Chain of Rocks.....	125,000,000 gallons.
Coagulant house.....	160,000,000 gallons.
Clarification capacity.....	100,000,000 gallons.
Conduit capacity.....	220,000,000 gallons.
High service pumping capacity.....	125,000,000 gallons.

Mr. Wall points out that if the daily working capacity of the present works should be increased to 150,000,000 gallons, the part of the present system which requires special consideration is the clarification process. "Before two years have elapsed there must be a great increase in purification capacity or St. Louis will have to put up with water insufficiently clarified and more or less impure" is the warning he issues.

The Water Commissioner declares himself on the question of filtration in the following words: "There is not one who has been in close touch with the work in detail but is ready to admit that the St. Louis process of water purification is not as effective as filtration; and then, to make the case for filters still stronger, figures and facts showing that the filtration is cheaper, both as to construction and in the matter of operating costs, are presented for our consideration. This being true, there is left no argument for the perpetuation of the St. Louis process."

W. F. Montfort, chemist at the waterworks, has made an extensive study of the quality of St. Louis water and in an appendix to Mr. Wall's report, he speaks of filters in the following language: "It is apparent that the addition of a filter plant to the coagulating basins is essential, if the residual sediment is to be finally removed and color reduced to an acceptable amount. Operations under prevailing conditions in a plant of this size and character do not admit of the close control possible in a filter plant, where the units (filters) are small, subject to immediate supervision and washing, and their output regulated by rate controllers. In the present Chain of Rocks plant there are six sedimentation basins of 30,000,000 gallons each, one basin of 40 million and two of 20 million gallons each, now used in series.

"It is manifestly impossible to interrupt the flow of water through any one basin at will, should the water contained in it prove unfit for use. Nor is it possible to wholly eliminate the previously accumulated sludge in filling the sedimentation basins.



COAGULANT HOUSE AT CHAIN OF ROCKS.

The proposed filters, Mr. Montfort states, would be of the usual mechanical or rapid filter type, with provision for washing by reversing flow through them at a fairly rapid rate. No air would be used in washing. All valves for regulation of filter operation would be electrically operated. A standpipe would furnish water under sufficient head for washing filters.

The cost of the filter house and filters complete is estimated at \$1,060,000; and that of the proposed reconstruction of the present plant, including this item, at \$1,250,000.

Steps already have been taken to provide an additional intake in the Mississippi river about 800 feet to the east and north of the present tower. This is regarded as a necessity as with the present intake only four gates are serviceable for entry at the lowest stages of the river. Last year considerable trouble was experienced with river ice. It accumulated on the outside of the screens of the intake gates and a large quantity made its way into the wet well. For eleven days in January, 1912, it was impossible to get more than 60 million gallons of water per day.

Surveys have been made and preliminary plans prepared for the new tower which will be of the same general design as the present one. The foundation will be on bed rock. The tunnel and shafts will be lined with concrete carefully finished to reduce friction. All gates will be motor-operated, and cable lines for power, light, and telephones will be laid in a conduit built into the tunnel lining.

The estimated cost of the work is:

Tower and superstructure.....	\$150,000
Tunnel and shafts.....	300,000
Screen chamber and wet well connection.....	50,000
Gates and appurtenances, cables and equipment, gratings, etc.....	50,000
	<hr/> \$550,000

In addition to this work, the revetment of some 3¼ miles of the east bank of the river will be necessary so that the channel may be retained at the towers, according to G. G. Black, engineer in charge of the Supply and Purifying Division of the waterworks.

"Within the last seven years, the banks above have been cut in over half a mile and the point of attack has moved downstream until it is now about one-half mile above the present tower," he states in an appendix of the report. The estimated cost of the revetment is \$200,000.

The proposition of placing an additional plant on the Missouri river has been investigated thoroughly by the department and surveys and soundings have shown a favorable location for the Missouri river intake about nine miles above St. Charles, Mo. Mr. Black, in discussing the proposed plant which is planned to have a working capacity of 100 million gallons daily, estimates the total cost at \$11,973,910, distributed as follows:

Land	\$ 613,750
Bank protection	237,600
Intake tower and tunnel	750,000
Pumping plant	1,500,000
Pump mains	2,376,000
Reservoirs and filters	3,450,000
Distribution mains	2,032,800
" "	1,013,760
	<hr/> \$11,973,910

Both tower and tunnel would be constructed of sufficient capacity to supply the final completed plant with a working capacity of 200 million gallons daily. The tunnel would be not less than nine feet in diameter and the tower large enough to accommodate gates in sufficient

numbers and size to permit an ample flow of water through the inlets at the lowest stage of the river.

From the tower to the bluffs where the pumping station would be located is approximately one-half mile. The pump mains necessary for carrying the water from the pumping station opposite the intake to Stratman's hill, where it is proposed to install the clarification plant, would be about nine miles long. They would be two in number, 6½ feet in diameter and made of steel.

At Stratman's hill there would be a set of preliminary settling basins holding not less than 200,000,000 gallons; a pair of coagulating basins, each holding not less than 1,500,000 gallons, and clear water basins with a total capacity of not less than 100,000,000 gallons. The water would be filtered before leaving the hill and would then flow by gravity to the city limits of St. Louis through two seven-foot steel pipes. They would be connected with the present distribution system by lines of 48-inch pipe.

A study of the relative quality of the Missouri and Mississippi water has been made by Mr. Montfort. He says: "So far as investigation of the question has gone, the indications are that for water taken from the vicinity of St. Charles, Mo., the cost of operation, including

charges, yet 1,000 cubic feet of gas is worth but little more than 1,000 cubic feet of water.

"In St. Louis about seven per cent. of the service connections are metered. These include all service connections larger than ¾-inch. Nearly one-third of the water pumped into the mains is measured and paid for at meter rates. Almost two-fifths of the entire revenue of the Water Department comes from the meter rates. At first sight this would seem to indicate that the meter rates are too high but this inference is incorrect.

"Ninety-three per cent of the services provide the remainder of the revenue, but less than one-half of the water pumped passes through these services. Fully one-fourth of the water pumped is used for public and free service and unpreventable losses.

"The fact that the department has been furnishing water to consumers for the past eight years at less than actual cost, cannot be too strongly emphasized. If the department is to be self-sustaining in the future, a general reduction of rates is not to be considered, but a revision to a more equitable schedule is most desirable.

"There may be some justification found for giving the manufacturer a rate as low as \$80 per million gallons, but there can be none for the ridiculously low figure of



PUMPING STATION AT CHAIN OF ROCKS.

softening and filtration, would be materially lower than for a point on the Mississippi river where the supply partakes of the nature of the combined waters we are now treating.

"From the standpoint of use in boilers, the upper Mississippi furnishes the better water because of its lower content of sulphates and the correspondingly small amount of hard scale which would be formed. But its high color is very objectionable for domestic use, where aesthetic considerations are to be regarded.

"While the Missouri river with its higher alkalies and sulphates and its high turbidity is not an ideal stream from which to derive a municipal supply, it presents an advantage in low cost of treatment with partial softening which outweighs the consideration of lower suspended solids of the upper Mississippi."

One portion of Mr. Wall's report deals at length with the question of water rates. It reads in part as follows:

"No flat rate schedule can be devised which will do even approximate justice to all, for the reason that the rate which averages right for a large number of families will be a rank injustice to the careful consumer and equally unjust to the city in the case of the wasteful consumer. No gas or electric company would attempt to give flat rates to consumers, except at exorbitant

\$33.33 for the public schools, which should be treated as other consumers."

The present meter rates in St. Louis present the disadvantage, found in so many cities a few years ago, of encouraging wasting of water under certain conditions, in that by so doing a consumer might obtain so much lower a rate on all his consumption as to really reduce his bill. Mr. Wall proposes the now common remedy of having reductions apply successively to quantities in excess of fixed limits, which he terms the "minimum rate" method.

Mr. Wall declares there is no logical reason why manufacturers should be furnished water at a special rate. He says: "To show what an inconsiderable fraction the cost of water is of the value of manufactured articles, the following examples are cited: At one of the large breweries in St. Louis, the total water license paid per year amounts to a tax of four cents on each barrel of beer containing 31 gallons and sold at \$8. Cost per automobile manufactured and sold for \$2,500, .53 cents; cost per thousand brick manufactured and sold for from \$7 to \$20, 2 cents; cost per pair of shoes manufactured and sold for from \$1 to \$2.50, .00209. The water license paid by one large shoe manufacturing corporation amounted to slightly more than three one-hundredths



PRESENT INTAKE TOWER IN MISSISSIPPI.
Picture taken when river was frozen over.

of one per cent of its total annual sales, estimated at seven-tenths of one mill per pair of shoes."

In discussing the service charge method of establish-

ing water rates, Mr. Wall says: "Rates should not be based upon favoritism, or the amount of good which the consumer gets from the service nor upon the quantity of the product for which he pays, except in so far as this last item affects the cost of the service. Following out this idea that a municipal plant should base its rates on absolute justice to all citizens, then water should be sold to all at a uniform price per 1,000 gallons, the only difference made between the small and large consumer being in a graduated service charge to cover the interest and depreciation charges on the cost of meters in place, including, of course, the cost of maintenance, reading meters and making out and delivering bills.

"The annual service charge would be collected only for the time the premises were occupied, but no service charge for any period should be less than \$1.00. Rebates would be made to the owner or occupant for the unexpired time of his license, and for the balance of his deposit remaining after the value of the water used had been deducted.

"To abolish the free use of water entirely, making all city departments pay for water used, and establishing an annual charge for fire protection, at so much per fire hydrant, would enable the department to supply water to all consumers at a rate probably about 6½ cents per thousand gallons.

"The principal arguments for the adoption of the above policies are that the payment of the first cost of all new work should be distributed over a long period of time, and not made a direct charge on water users at the time the work is done; also that the free and public use of water and for fire protection should be made a charge against the public funds, since all of the people in the city benefit by such service. If the various departments of the city government to whom water is now furnished free in unlimited quantities, knew that the cost would be taken from their funds, there would soon be a most remarkable decrease in the quantities found necessary for their use. At least 25 per cent of the water now supplied for free and public use is wantonly and carelessly wasted."

STREET LIGHTING.*

Lighting Business, Residence and Suburban Districts, Parks and Boulevards.—Electric Incandescent and Arc Lamps.—Gas Lamps.—Upright or Pendant Globes.—Candle Powered Desirable.—Spacing Standards.

LIGHTING IN BUSINESS DISTRICTS.

Business district lighting includes such streets as harbor the majority of retail stores; avenues bordering on public squares and highways leading to railroad stations, and certain places of note and distinction. In these districts an average intensity of from .4 to .5 foot-candles is good practice. The ratio of maximum to minimum should not exceed five to one. In addition to the production of a sufficient intensity, a system of illumination should be provided which is ornamental, one that appeals to the senses of beauty, harmony and art. The first impression of a transient public is created by the business district. Therefore, commercial lighting of such a portion of the city is incomplete without the harmonious application of the extraordinary.

In numerous cities it has been found that abutting properties have been materially improved as street lighting systems have advanced. This, in turn, has increased real estate values, which directly affect a city's progress.

LIGHTING THE RESIDENCE DISTRICT.

Thickly populated portions of the city, cross streets and avenues removed from the business quarters are the

sections included. Congestion in such sections is not great, being confined almost wholly to the traffic of pleasure seekers. A low even intensity, averaging from .1 to .2 foot-candles proves satisfactory. High candle power sources are impractical when spaced at great intervals on wooded streets, as they become markers of street intersections, instead of producing illumination. The area beneath the unit is very bright, shading off in intensity to an impractical value between units. To obtain maximum returns in lighting, it is necessary that the distribution of light come below the canopy of the surrounding foliage.

It is the consensus of opinion of your committee that small units, placed at shorter intervals and beneath the foliage of trees, produces a more satisfactory arrangement for this lighting service.

SUBURBS, PARKS AND BOULEVARDS.

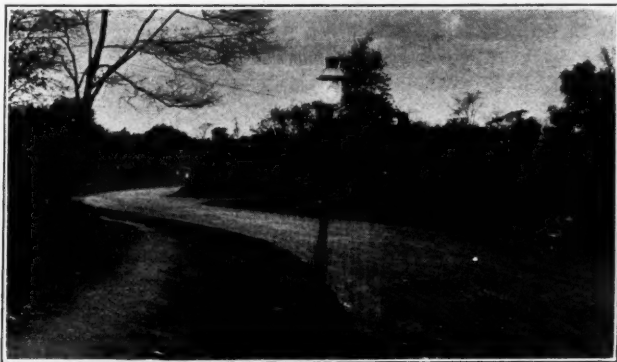
The points brought up in connection with the residence lighting apply equally well to suburban lighting. The units, however, may be mounted at a greater height, and consequently at a proportionately greater distance. The intensity is somewhat lower than that suggested for residence districts.

The lighting of public parks and drives is generally

*From report of Committee on Street Lighting of the American Society of Municipal Improvements, D. A. Hegarty, Chairman.

not very easy of accomplishment. In addition to the low hanging foliage, the topography of the land is very irregular. Definite rules are impossible, as irregularities prevail. While it is very fitting that ornamentation be considered in this class of lighting, the function which a suitable system must perform should not be overlooked, viz.: the production of an adequate illumination.

Around winding boulevards and drives, particular attention should be given to the placing of units. Curves should stand out clearly and advantage be taken of the contrast by shadow or "silhouette" principle of viewing objects at night. Unless care be taken in this regard, the image produced in the eye by a light source improperly located may be so intense, as compared with that produced by other objects, that the windings of the driveway are totally obscured. Sources should be invariably on the inside of curves, for the driver of a vehicle is then looking away from the light, and vision is much more distinct. Vehicles coming to the top of a hill where the units are placed in the outside of the curve have a tendency to edge in from the lights. The result is frequent collision or narrow escape with down-coming vehicles. An ideal arrangement would include



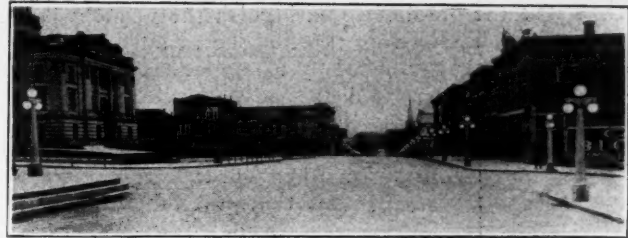
DECEPTIVE ARRANGEMENTS OF LIGHTS.
Gives appearance at night that roadway is straight.

the location of light sources on the inside of the curve, with a white fence flanking the outside. Resulting from poor illumination of parkways are many accidents which could well be avoided. The accompanying picture illustrates the bad combinations liable to arise from staggered boulevard lighting. At this particular place one unfamiliar with the road would at night imagine it to be straight, and endeavor to cross the gardens and grass plots, instead of keeping to the road.

STREET LIGHTING WITH INCANDESCENT LAMPS.

Ornamental Lighting in the Business Districts: Your committee, upon investigating ornamental lighting in the business district, found the following conditions to exist:

Multiple 110 volt distribution has proven to be the most satisfactory. These standards, as a rule, are of one of three materials—cast iron, pressed metal or concrete. Some of the designs in the last are very unique and serviceable, and they have the added advantage of being produced at a reasonable price by a municipality. The four and five-light standards are the types used most generally. Three-light standards are used in the smaller towns between blocks, with five-light standards at intersections. In average sized cities, or in larger cities, where merchants have installed a commercial lighting system, four-light posts are found. Five-light standards are found in the large cities, where commercial street lighting comes wholly or partially under the municipal government. Your committee has noticed eight of these clusters arranged at street intersections in some of the larger towns, one located at each intersection of building and curb lines. This arrangement is



THREE-GLOBE STANDARD, BLOOMINGTON, IND.

very attractive and at the same time raises the intensity of illumination at street intersections, where it is necessary, and much disturbance caused by trolley and telegraph posts located at the position desired for a standard is eliminated in the majority of cases.

A certain tendency is noticed toward the installation of one-light standards using high wattage Mazda lamps. We believe that such installations are effective, and produce results similar to those obtained with more than one lamp per standard. They are considered as more artistic and harmonious by many.

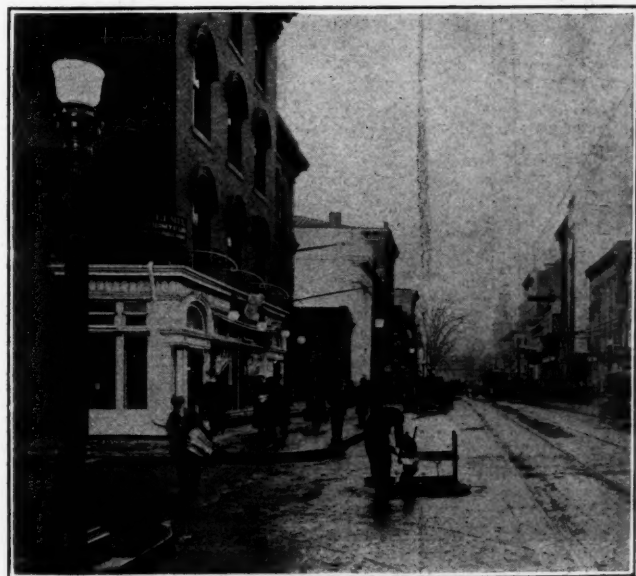
The usual mounting height averages about 13 ft. 6 in. to the middle of the top globe. This mounting height your committee believes to be somewhat low. The



FIVE-LAMP STANDARDS, NILES, O.

tendency should be to raise the standard so that the bottom of the pendent globes will be approximately twelve feet over the street surface. This recommendation applies only to streets of average width, and where standards are spaced an average distance. The mounting height should be proportionately greater on very wide streets, or streets where the spacing is increased greatly over that recommended.

Your committee has found that in a large number of



ORNAMENTAL LUMINOUS ARC, NEW HAVEN.

towns it is the practice to extinguish the pendent lamps about midnight, allowing the top one to burn until sunrise. This is accomplished by using a three-wire system of distribution, so arranged that the midnight and all-night lamps are extinguished by separate switches.

The spacing of standards should average between sixty and eighty feet. In other words, the spacing recommended is from five to six times the mounting height



FIVE-GLOBE STANDARD, SEATTLE.

of the lamps. We found this to be the most prevalent, and the results have been satisfying.

The equipment most generally used on standards is given in the following table. The density of the diffusing globe should be such that the filament of the lamp cannot be seen through the globe. This subduing of the filament is accomplished in some of the alabaster and opalescent globes.

The question arises—which is the better on ornamental standards, pendent or upright globes? From an



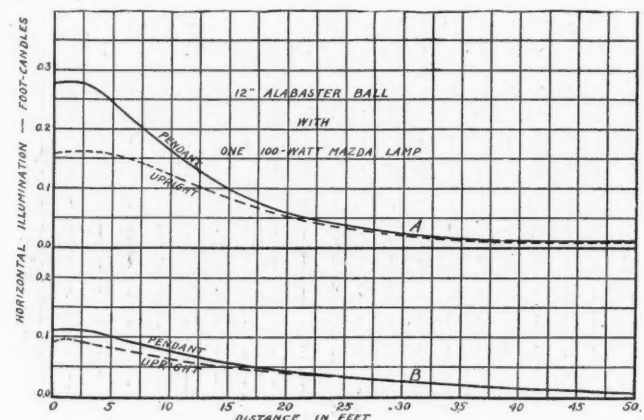
ORNAMENTAL ARC STANDARD WHICH IS DETRIMENTAL TO THE BUSINESS DISTRICT.

engineering point of view, the most uniform illumination is the most satisfactory. By having globes upright, a more uniform illumination is obtained; the intensity directly under the standard is not as high, and that resulting between standards is practically the same.

EQUIPMENT GENERALLY USED ON STANDARDS

One-Light	1-250 w.	1-14 inch
	1-400 w.	1-16 inch
	1-500 w.	1-18 inch
Two-Light	2-60 w.	2-12 inch
	2-100 w.	2-14 inch
Three-Light	2-60 w., 1-100 w.	2-12 inch and 1-14 inch
	3-100 w.	3-14 inch
Four-Light	4-60 w.	4-12 inch
	4-100 w.	4-14 inch
Five-Light	4-60 w., 1-100 w.	4-12 inch and 1-16 inch
	5-100 w.	4-14 inch and 1-16 inch

But if it is the desire to obtain a high average intensity, globes turned downward increase the total amount of light directed toward the street surface about thirty per cent.



CURVES SHOWING DISTRIBUTION WITH UPRIGHT AND PENDANT GLOBES.

Lamp 14 feet above street surface.

Curve A—Illumination along line of posts.

Curve B—Illumination along line of 14 ft. out from line of posts.

Construction is a matter governed greatly by local condition. Standards are usually anchored to a concrete cube about two feet on a side. The feeders are placed either underground or overhead, the most satisfactory being the former. The underground construction is done in one of three ways: First, by the use of steel armored cable, placed in a trench and covered with an envelope of concrete for protection (in case this is not desired, merely covered with sand); Second, iron conduit is used, into which rubber covered wire is pulled; Third, by the use of fibre or clay conduit with lead covered cable.

The first system has the objection of high cost of repairs, due to the fact that trouble is hard to locate, and when located is expensive to remedy. The use of armored cable is not to be discouraged, however, and is preferable to iron conduit. The second deteriorates greatly, and in the course of ten years is practically unfitted for service. The last named method, although most expensive, is the most flexible and the most easily handled.

Lighting in Residential and Suburban Districts: Series distribution in these sections is universal and the 6.6 ampere lamp is usually recommended. The units are suspended either from poles supplied expressly for the purpose, or from telegraph poles. The mounting height recommended is from twelve to fourteen feet; but this is limited by the surrounding foliage, and to obtain the maximum throw of light the units must necessarily be placed below any foliage obstruction. In wide, open areas it may be desirable, in consideration of wider spacing, to mount units as high as sixteen



MICHIGAN AVENUE, CHICAGO, SOUTH FROM RANDOLPH.
Ornamental light standards. Good height.

feet, in order to receive the benefit of a wider throw from the unit.

Units may be spaced in a single line, suspended along either the center of the street or along one side of the street from mast arms secured to telegraph poles or poles specially located. Or they may be located according to a staggered system, in which case they advance alternately one half of the distance chosen between standards on one side. A spacing of 125 feet lengthwise of the street may be given for the single line arrangement, and 150 feet if staggered (300 feet on a side). Sixty, eighty, or one hundred candle-power lamps are used, according to the nature and importance of the thoroughfare. The most prevalent are the eighty candle power.

Single line centre suspension lighting compares unfavorably with single line side suspension lighting on account of the numerous law suits and claims which are registered from contact with high tension. For the leads to the lamp are long and at times are liable to become detached and fall to the ground. The system also lends itself less to pleasing construction.

In suburban districts, the same arrangements of units are accepted. A lower intensity proves satisfactory, which may be obtained either by increasing the spacing with the same size of lamps, or by using smaller candle power lamps with the same spacing. It is recommended to install as small units as is practicable, and group these as closely as is compatible with construction costs. Obviously the smaller the unit the closer they must be spaced.

Lighting of Public Parks, Drives and Boulevards: Although either of the systems named for the previous

classes of lighting may be used in park lighting, something ornamental harmonizes better with the surroundings. Therefore a lantern standard of some pleasing design, or a single ornamental standard holding an upright globe is found to be the most generally used.

The mounting of standards should be as high as possible, especially on drives and boulevards, in order that they may be out of the line of vision and also that the difference between a hole in the pavement and an obstruction may be distinguished. If units are placed low, the casting of long shadows makes it impossible to detect this difference.

No rules can be specified as to location of standards except as given in the general discussion. The topography of the land determines, to a great extent, the spacing and design of the lighting system.

Underground distribution is to be recommended in parks and boulevards, as overhead wiring tends to spoil the effect created by an ornamental installation. In a park installation the cost of conduit or concrete envelope is rather high. For this reason steel-armored cable merely laid in a trench is used. This construction gives an installation of moderate cost, and one which has been found, in our investigations, to be entirely satisfactory.

STREET LIGHTING WITH ARC LAMPS.

Ornamental Lighting in the Business District: As before stated, your committee believes that lighting of the business district should be out of the ordinary. Embodying this idea, various combinations of arc lamps on poles have been brought out. Some of these designs we believe to be more detrimental than helpful in creating a pleasing impression.

There has been developed lately an ornamental magnetite arc lamp placed upon a standard for boulevard and business district lighting. Standards used in connection with these arc lamps are of the materials given for incandescent clusters. The mounting height to the center of the globe is approximately fourteen and one-half feet. This height, we believe, should approximate twenty feet with a spacing of from one hundred to one hundred and fifty feet. On very narrow streets a system of this kind is not to be recommended, as the intensity and glare produced are prohibitive. If the standards were placed far enough apart to give the desired intensity, the installation would be awkward. The arc itself consists of the regular magnetite lamp with the operating mechanism inverted. The globe is of dense opal glass artistically formed, which tends to distribute and diffuse the light properly. The maximum candle power from this lamp is given at about thirty degrees below the horizontal. It operates on a constant current D. C. circuit of 6.6 amperes, and is very well adapted for this class of lighting.

There are a few points which your committee desires to call to your attention. We believe that a high candle power source of such brilliancy should have a somewhat higher mounting height. As the unit is now located, it may be considered as directly in the line of vision. We also believe that an unnecessarily high intensity results from the location of these units, as recommended by manufacturers. This high intensity works to the detriment of the merchants in displaying wares in their show-windows. This type of lighting is also limited to the larger cities, or where large appropriations are available for street lighting purposes. Another objectionable feature of this system is the placing of high tension current underground.

On narrow streets in foreign countries a unique system of street lighting is carried out which enhances the attractiveness and gives to it a very open impressive appearance. This practice consists of suspending arc lamps at some distance from the street level on building fronts. The facades of the buildings, although variable in the nature of construction, reflect a certain portion of the light on to the street level. The combination of the brightness of the building fronts and street level produces a bright, commanding appearance.

Lighting in the Residential District. It is not the intention of your committee to draw comparisons between arc lamps for residential district lighting; but rather to draw comparisons between units as illuminants for street lighting.

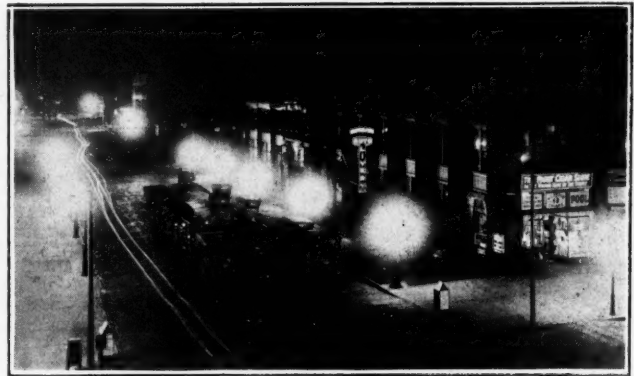
Up to the present time it has been the practice to install arc lamps for the purpose of markers at street intersections, rather than for the successful production of street illumination. To render illumination more effective in these districts, glare should be eliminated and uniformity produced. With these requirements, an arc lamp placed at a proper mounting height in relation to



TYPICAL OF GOOD ARC LIGHTING, RESIDENCE STREET.

the usual spacing of from 350 to 400 feet (an average city block) results in a considerable falling off of intensity between lamps. This decrease of intensity is accentuated by the fact that the majority of residence streets in towns are wooded. The ability to see at the low intensities provided depends largely upon the adaptation of the eye. If the lighting varies greatly from point to point, the danger of accidents occurring in the shaded places between lamps is unnecessarily great, because the gloom encountered is exaggerated by contrast. These requirements, therefore, favor the use of smaller lighting units spaced a relatively shorter distance apart, which practice enables the mounting height to be such that the maximum throw of light from the lamp will be unobstructed.

Lighting the Suburban District. In suburban districts or country roads, the highway may or may not be wooded. The fact that an arc lamp is a unit of high cost and high candle power necessitates greater spacing with a consequent decrease of illumination between lamps. If the thoroughfare under these conditions is heavily



SPOT LIGHTING GIVEN BY ORNAMENTAL GAS LIGHTS.

wooded, the situation is brought to an almost impractical point. Therefore, your committee likewise recommends the use of small units for this division of street lighting.

Lighting Public Parks, Drives and Boulevards. In lighting public parks, drives and boulevards, conditions similar to those of residence and suburban districts hold true. The problem is more complex, however, for there are found winding drives and irregular ground. For these reasons arc lamps in parks have found but small favor. Your committee favors the use of small units for lighting conditions experienced in parks. On straight-away boulevards, arc lighting has received considerable commendation. The arc lamps are hung at considerable height about the roadway—twenty-five to thirty feet—which suspension distributes a fairly uniform intensity devoid of sharp, long shadows and of ample value.

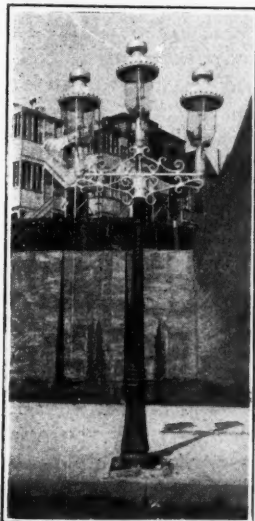
STREET LIGHTING WITH GAS LAMPS.

Ornamental Lighting in the Business District. Up to within a few years, ornamental lighting in the business district consisted of two, three or more gas arcs, utilizing upright mantles. These arcs were mounted on standards which appeared very awkward and top-heavy. The development of the inverted mantle has brought about the ornamental gas standards, which in appearance are similar to the incandescent clusters already mentioned. Your committee desires to draw attention to a number of facts concerning the ornamental system of gas lighting.

The illumination produced is very pleasing and as a decorative feature the designs harmonize well. The distribution of the light flux, however, is decidedly downward and produces spot-lighting at the standard. Inconvenience is also a matter for consideration. The fact that each lamp must be lighted separately means

stained, unsightly globes, and breakage. Automatic lighting by pressure gas waves has been experimented with, but its development is not perfected. These lamps are subject to the same criticism as are single lighting units in the residence district, viz.: the candle power of the mantles is a variable quantity, and in reviewing tests which have been carried on, we find the average candle power produced to be much less than the rated candle power.

Lighting the Residence District. The main objections to the lighting of residence districts with upright gas mantles are the uncertainty of the candle power produced, the number of outages and the lack of convenience. Here, also, each lamp must be lighted separately. The candle distribution from the lamp is not ideal in that the maximum candle power is directed horizontally. Much of the light therefore is wasted in lighting the surrounding trees and foliage.



TOPHEAVY GAS
STANDARD.

Lighting the Suburban District, Parks, Boulevards, Etc. — In the lighting of suburban districts and parks, we find that the gasoline vapor lamp is used quite extensively. Its position is that of a substitute for gas or electricity

until it is possible with further extension to use such service. The mantle used is similar to the upright mantles of ordinary gas standards and the same objections are pertinent. The vapor units are usually located in open places, where air currents materially affect the mantle. The results are flickering, broken mantles and low candle power.

CITY PLANNING COMPETITION.

Information was given by us a few weeks ago concerning a plan of the conference on City Planning, by which they hope to secure the submission by experts of several plans for the development of a certain specified area or plot of ground along modern lines; this to include street development, housing and the other features which are involved in complete planning of municipalities. No prize was to be offered, but presumably the advertising given to the competitors was considered sufficient inducement.

The City Club of Chicago is now offering cash prizes for the best plan submitted for laying out and improving, for residence purposes, a quarter section of land assumed to be about eight miles from the business district of Chicago, on level prairie land, the area being surrounded by sections laid out after the prevailing grid-iron fashion. A street car line is supposed to pass along each of two sides, with the possibility of similar lines on the other two sides. It is assumed that the business district may be reached in about forty-five minutes.

Each competitor will submit two drawings, one a plan drawn eighty feet to the inch, showing streets, lots and location of dwellings on them, public parks or other open spaces, and the designation of spaces for business, recreation, educational and administrative buildings, etc.; also a bird's-eye perspective of the area or some portion of it. There will also be a typewritten statement giving the number and sizes of lots, number of families to be

accommodated (not to exceed 1,280), length of public sewers, square yards of street pavement and of sidewalk, percentage of total area in streets and amount of area devoted to parks, public buildings, such as schools, public bath houses and the like.

Three prizes will be awarded, \$300, \$200 and \$100, respectively; the award to be made by a jury of five chosen by a joint committee of the City Club and of the Illinois Chapter of the American Institute of Architects. Inquiries for information should be addressed to "Housing Competition," City Club, No. 315 Plymouth Court, Chicago, Ill.

REGULATING STOPPING OF CARS.

Powers of Municipalities to Regulate Street Railroad Stops at Steam Railroad or Street Crossings, for Passengers, Etc.

The power of municipal corporations to pass reasonable ordinances regulating the stopping of street cars has, in many cases where such ordinances were involved, been unquestioned. In the majority of the instances where their validity has been attacked the grounds urged have been that they were unreasonable and oppressive.

CROSSING RAILROAD TRACKS.

An ordinance which required the conductor of a street car to go across the tracks of a steam railroad in advance of his car, and prohibited the motorman from moving the car across the track until signalled to do so by the conductor from the other side of the track has been held valid. The objection urged against it was that it was unreasonable, oppressive, unfair and arbitrary. Cities, it was said by the court, have power to enact ordinances for the security and protection of their citizens. The evident purpose of the ordinance was to add to the security and safety of the citizens traveling in the street cars; and it was well calculated to achieve this purpose. *Indianapolis Traction, etc., Co. v. Formes*, 40 Ind., app. 202, 80 U. E., 872.

In *Gulf, C. & S. F. Ry. Co. v. Holy*, 30 Tex. Civ. App., 330, 70, S. W., 591, a city ordinance which required the motormen of electric street cars in the city to stop their cars and ring their gongs at a distance of five feet from any intersection with a railroad track was held not to be unreasonable on its face, and no fact was pleaded or proven to show that it was unreasonable. Such an ordinance was held to include switch and spur tracks, as well as the main railroad track. *Galveston, H. & S. A. Ry. Co. v. Vollrath*, 40 Tex. Civ. App., 46.

A New Jersey case holds that the power to compel steam railway companies to bring their trains to a stop before crossing a street on which a street railway is operated, has not been conferred by the legislature upon municipal corporations by any general law, and was not granted to a city by its charter power "to regulate the speed and running of locomotive engines and railroad cars through said city." It was also held that an ordinance requiring that the signal to be given to an approaching locomotive engine or train that a street crossing is free from danger must be given by a member of the crew operating such locomotive engine or train, is unreasonable, *Central R. Co. v. Elizabeth*, 70 N. J. L. 378. But in *Baltimore & O. R. Co.*, 10 App. Cas. (D. C.) 111 it was held that police regulations requiring steam railroad trains to be stopped before crossing other railroads operated by steam are not in themselves unreasonable.

CROSSING STREETS.

A city ordinance provided that all passenger cars operated by trolley or electric power should come to a full stop at each and every street before crossing the same. It was objected to by an electric street railway company holding a franchise from the city as not being legislative in its character, passed without notice to the railway company, not within the powers of the city council, and unreasonable. The city, under its charter, was given authority to regulate the use of the public streets and highways. It was held that the power to reasonably regulate the operation of the street railways in the city was implied from the authority conferred by the city charter. It was a police power and as such might be exercised without notice to the parties claiming interest. The exercise of the power was legislative in its character. It did not invade any private right. It did not appear to be unreasonable on its face, and the burden of proof of this was on the railway company. The ordinance was held to be valid. *Cape May, D. B. & S. P. R. Co. v. City of Cape May*, 59 N. J. L. 404, 36 Atl. 678.

Unfair discrimination between companies would, it seems, render such an ordinance void. So in *City of Buffalo v. New York, L. E. & W. R. R. Co.*, 152 N. Y. 276, it was said that an ordinance against railroad trains crossing certain streets without first stopping, applicable on its face to all railroads without exception, was an unfair discrimination against the particular railroad which crossed the streets named, where it was shown that these streets were but little frequented, while all other railroads were permitted to cross more frequented streets without any such restriction.

ON MEETING OBSTRUCTIONS.

A city ordinance providing that no person in control of a street car should, on the appearance of any obstruction to his car, fail to stop it in the shortest time and space possible, was objected to as unreasonable, in that it required the stopping of a street car under all circumstances, without regard to the safety of the car or persons therein. It was held that it was nothing more than a declaration of the law, and only required the stopping of a car as soon as possible upon the appearance of an obstruction, with due regard for the safety of the passengers. *Gray v. St. Paul Ry. Co.*, 87 Minn. 280. A similar ordinance of the city of St. Louis, coupled with a provision that the motorman shall keep a vigilant lookout for vehicles and persons on foot, has been held a valid police regulation and also merely declaratory of the common law by the Missouri courts, *Deschner v. St. Louis & M. R. Co.*, 200 Mo. 310, *Gebhardt v. St. Louis Transit Co.*, 97 Mo. App. 373, although its validity has also been held to rest upon the fact that street railways receive their franchises upon the condition of yielding obedience to the city ordinances, *Faith v. Tower Grove & La Fayette Ry. Co.*, 105 Mo. 537, and proof of an acceptance by the company of the provisions of the ordinance was held necessary before a civil liability can be established against it for a breach thereof, *Murphy v. Lindell Ry. Co.*, 153 Mo. 252. A precisely similar ordinance was held to be reasonable by the Tennessee Supreme Court, and failure to observe it negligence per se, rendering a street railway company liable for injury of which such negligence was the proximate cause. *Memphis Street Ry. Co. v. Haynes*, 112 Tenn. 712.

TO TAKE UP AND LET DOWN PASSENGERS.

A city ordinance requiring cars to stop on the far side of a crossing so as to clear the street or avenue from the sidewalk, and prohibiting the violation of the regulation under a penalty as a misdemeanor has been held valid. *North Birmingham Street Ry. Co. v. Calderwood*, 89

Ala. 247. See also *Lockyear v. Covert*, 2 Ohio C. C. 389; 25 Ohio C. C. 486. The report of a city engineer to the council recommending that cars should be required to stop at certain specified points, adopted by resolution of the council, was held to be binding on the street railway in *City of Toronto v. Toronto Ry. Co.*, 12 Ont. L. R. 534.

A different rule has, however, been applied to interurban cars. In Ohio it is held that municipal corporations have no power to require by a penal ordinance the stopping of interurban cars to take on and to discharge passengers. *Townsend v. Circleville*, 78 Ohio St. 122. In Minnesota a village passed an ordinance requiring railroad and street cars which occupied public streets for the purpose of operating thereupon, to stop at grade crossings of streets when any persons required to enter or alight. It was held that a suburban railroad company operating within the village limits could not be compelled by mandamus so to stop. Three reasons were given for the decision. 1. The ordinance was not a legitimate exercise of the police power. 2. The railroad company's lines did not in fact occupy the street, but were constructed on its own right of way. 3. The ordinance was opposed to public policy. The company was not a street railway company, but a suburban railway company, with the power to condemn lands. The requirement that it should stop at every street intersection to take on and discharge passengers tended to destroy its usefulness as a carrier of passengers and to destroy competition with steam railways; and the observance of the ordinance did not subserve public convenience. *Village of Excelsior v. Minneapolis & St. P. S. R. Co.*, 108 Minn. 407.

NEW BEDFORD INTERCEPTING SEWER

Reinforced Concrete and Cast Iron.—Laying Outlet Thirty-three Hundred Feet from Shore.—Sediment Intercepted and Washed.

By ARCHIBALD A. TALMAGE.

New Bedford, Mass., is building an intercepting sewer which, it is estimated, will cost when finished \$1,680,000, and which will take the whole of the sewage of the city as it comes from the various sewers at present constructed and, after screening out the floating matter and taking out the sand, will discharge it into the waters of Buzzards bay, 3,300 feet from the shore. Work on it has been in progress for some time, and although the whole system will probably require five years or more to install, there are certain sections of it which are well under way.

At the present time the sewers of the city discharge into the waters of the Acushnet river and into Clarke's cove, both of them estuaries of Buzzards bay. The growth of the city and the increasing amount of the sewage discharge have resulted in the waters of these estuaries becoming so polluted that the taking of shell fish from them had to be prohibited by the State Board of Health, while the putrefaction of the sewage matter deposited on the shores, especially at low tide, has created a stench that is becoming more and more intolerable. After extended investigation it was decided that the waters of Buzzards bay were of sufficient volume to dispose of the sewage of the city by dilution for many years to come, without in the least injuring any other community bordering on them. The problem was to get a sufficient distribution of the sewage matter, and to get rid of the sand and the floating matter mixed with the sewage. The new system was designed by William F. Williams, formerly city engineer of New

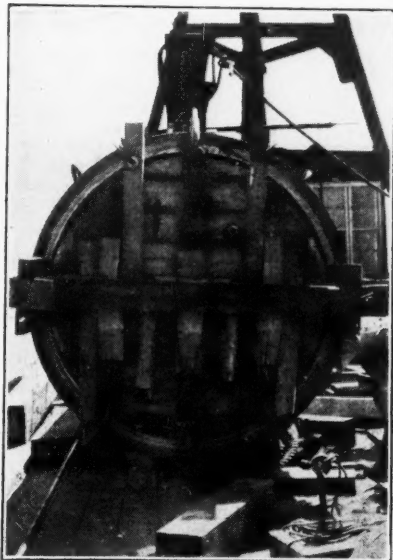
Bedford and now chief engineer of the Harbor and Land Commission of Massachusetts, and it has been gone over and approved by various engineering authorities, including the firm of Metcalf & Eddy, consulting engineers of Boston.

The city is built on a low ridge of ground, which runs in a general northerly direction. The Acushnet river lies to the east of this ridge while Clarke's cove lies to the south of it, being separated from the Acushnet river and the lower New Bedford harbor by a long peninsula, called Clarke's point, which juts out into Buzzards bay. The city is approximately ten miles long, from north to south, and is three miles wide at its widest point, containing an area of 12,371 acres. Only about one-third of this is settled very thickly, and only about half of it will be served by the intercepting sewer when it is finished. The city had a population by the 1910 state census of 96,652, and an estimated population in 1912 of a little over 100,000. The present maximum sewage flow is 42,200,000 gallons per day, with a dry weather flow of 13,400,000 gallons per day.

The intercepting sewer when it is finished will have a capacity of 120,000,000 gallons per day, or on a basis of a maximum flow of 400 gallons per day for each inhabitant, sufficient for a population of 300,000. It is estimated that the city will not reach this size for at least thirty years. As the allowance of 400 gallons per day per inhabitant is practically twice what is generally figured for a dry weather flow of sewage, the interceptor will probably be enough to take care of 600,000 population provided a separate system of sewers is installed. The city at present has 88 miles of sewers, 5.6 miles of which are built according to the separate system. All the sewers in the future will be built on this principle and the whole sewer system will gradually be changed to the separate system.

The intercepting sewer will operate entirely by gravity and will extend the entire length of the thickly settled portion of the city. It will run as near as possible to the Acushnet river water front, and for the greater part of its length will have a grade of two feet in five thousand. From the head of Clarke's cove south to the location of the screen house, however, it will have a grade of approximately .056 per cent., while from the screen house south to Fort Rodman and thence out into the bay it will have an average grade of about 1 foot in three thousand.

There are at present thirty-one sewer systems emptying into the Acushnet river along the water front, and the main line of the interceptor will connect with all of these above their outlets. There will be a spur running off at right angles from the main interceptor, which will cross the city at the head of Clarke's cove, and will intercept the sewers which empty into Clarke's cove, conducting their flow into the main line of the intercepting



END OF PIPE READY FOR LOWERING.
Shows bulkhead, and lead calking.

system. Including the spur, the new sewer will be 38,900 feet long, the spur being 1,700 feet in length, and having a Y branch for house drains every thirty feet.

As the nuisance in Clarke's cove is the most acute, the first step will be to construct the main line as far as the place where the spur branches off and then to construct the crosstown section at the head of the cove. This part of the work is estimated to cost \$600,000 and has been let in five separate contracts. The first to be begun was the work on the outfall, extending from the water line at Fort Rodman, 3,300 feet out into Buzzards bay, and this was given to Patrick McGovern of Boston for the sum of \$68,908. The second section, that crossing the government reservation at the fort, and northerly to the screen house located on the west shore of Clarke's cove, contains a total of 4,430 feet of sewer and was given to the J. W. Bishop Co., of Providence, R. I., for the sum of \$98,828. The third section, the screen house foundation, grit chambers, mixing room, boiler room, together with about 100 feet of sewer on either side of the screen house, was given to Frank A. Gamino, of Boston, for the sum of \$41,411. The fourth section, from the screen house section northerly to the head of Clarke's cove, about 6,200 feet, was given to Frank A. Gamino for the sum of \$104,243.75. The fifth section, from where Gamino's work stops to the point where the spur branches off, thence westerly across the head of Clarke's cove, a total of about 3,200 feet, is being done by the city, using her own sewer gangs.

The submarine section or outfall follows the general line of the sea bottom, which at this point is fairly level, but is laid in a trench having a minimum depth of ten feet, which has been dredged out to the width of ten feet at the bottom. Recently, in attempting to finish the dredging of this trench, a ledge of rock was struck and a drill boat has been engaged in drilling holes in the rock for blasting purposes.

Eventually, when the sewer is entirely built, there will be two sections to the outfall, each at least 3,300 feet in length, which will extend out, nearly at right angles with each other, from an outfall chamber 12 feet square located at the water line on the Fort Rodman reservation. In this outfall chamber there are located two hydraulic cylinders which will be used to raise the three ton sluice gates 7 feet by 7 feet each, one of which will be at the entrance to each section on the outfall. These cylinders will be operated by hand power pumps at present; later, electrical pumps may be installed.

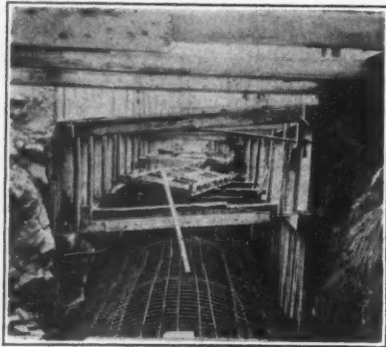
The outfall itself will be constructed entirely of 60-inch cast iron pipe, and only one section is being laid at the present time.



METHOD OF CLAMPING BULK-
HEAD ONTO END OF PIPE.

It is expected that the second section will not be required for at least fifteen years to come. Each 12-foot length of bell and spigot pipe weighs about seven tons. It is laid in sections containing four lengths, which are fitted and caulked on shore before being taken on board the barge from which they are lowered into position. Five lengths are jointed together with hot lead, then the fifth length is pulled out and

used for the first piece of the next five lengths, while the other four are swung aboard the barge by means of a steel I-beam having four slings of steel cable which fasten around the middle of each length of pipe and prevent the joints



SEWER TRENCH, SHOWING REINFORCEMENT.



END VIEW OF CONCRETE SEWER.

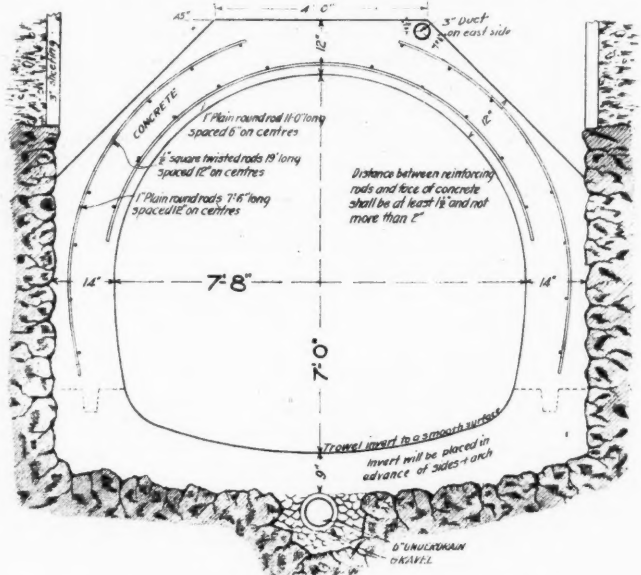
Reinforcing rods extending through end form.

of a block and tackle attached to one of the barges. The joint is then caulked by the diver, who uses a compressed air hammer to drive the cold lead tightly into the joint.

The outfall is being laid from the outer end, the outermost piece been put into position first. The line ends in a quarter turn upward, the face of the opening being about thirty feet beneath the water at low tide. This outlet was placed in a timber crib while it was still on shore, and after it was lowered into the correct position the crib was filled with concrete and surrounded by a

great deal of rip rap to hold it in position firmly. Before being lowered, the face of the outlet was covered with a watertight timber bulkhead, which was clamped firmly into position by means of a metal ring encircling the pipe just back of the bell. Through this bulkhead was run a small pipe through which the contractor could pump either water or air. Before each forty-eight-foot section of outlet is taken from the assembling wharf, the shore end is tightly covered with a similar bulkhead, so that after each section is laid and jointed to the next section the whole can be tested for leaks. Water is pumped into the pipes and is measured as it is pumped in, and in this way the amount of leakage is ascertained.

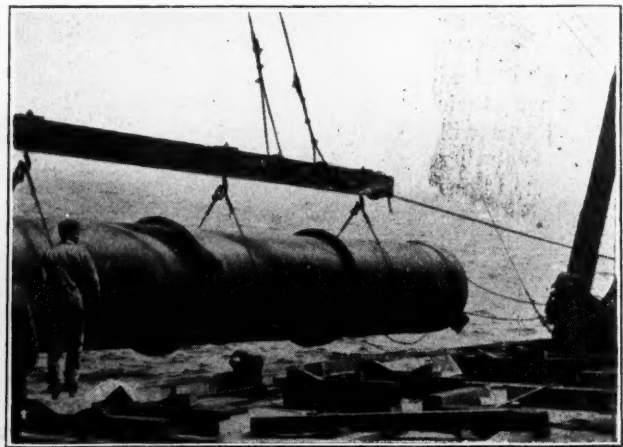
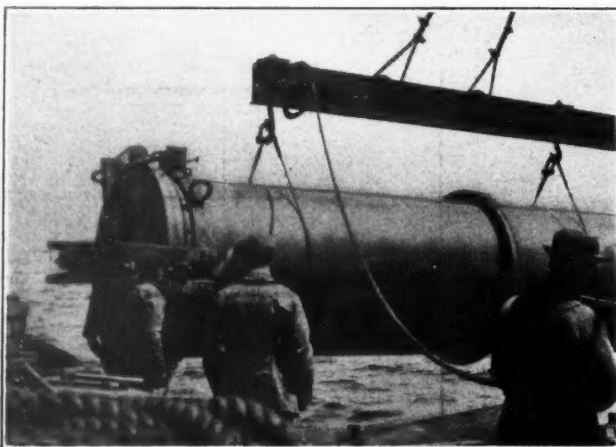
The sewer from the water line north is to be of con-



SECTION OF CONCRETE SEWER IN ROCK.

crete, properly reinforced, and is to vary in size. At its lower sections it is to be horse shoe shaped with a slightly hollowed invert and a height of seven feet. At its extreme upper end it is to be round, and have a diameter of 3 feet. The portions now under construction have re-enforcing in both the overhead arch and in the invert where the sewer is laid through earth. Three-quarter-inch twisted iron rods spaced 6 inches apart are used for the longitudinal reinforcement in the upper arch, with half-inch rods spaced 12 inches apart for the transverse reinforcing. When going through heavy ledge the reinforcing is reduced to about 40 per cent. of this amount, and no reinforcement at all is placed in the invert.

As the flow will be necessarily slow on account of the



SECTION OF SUBMARINE PIPE, SUPPORTED FROM I-BEAM BY SLINGS.

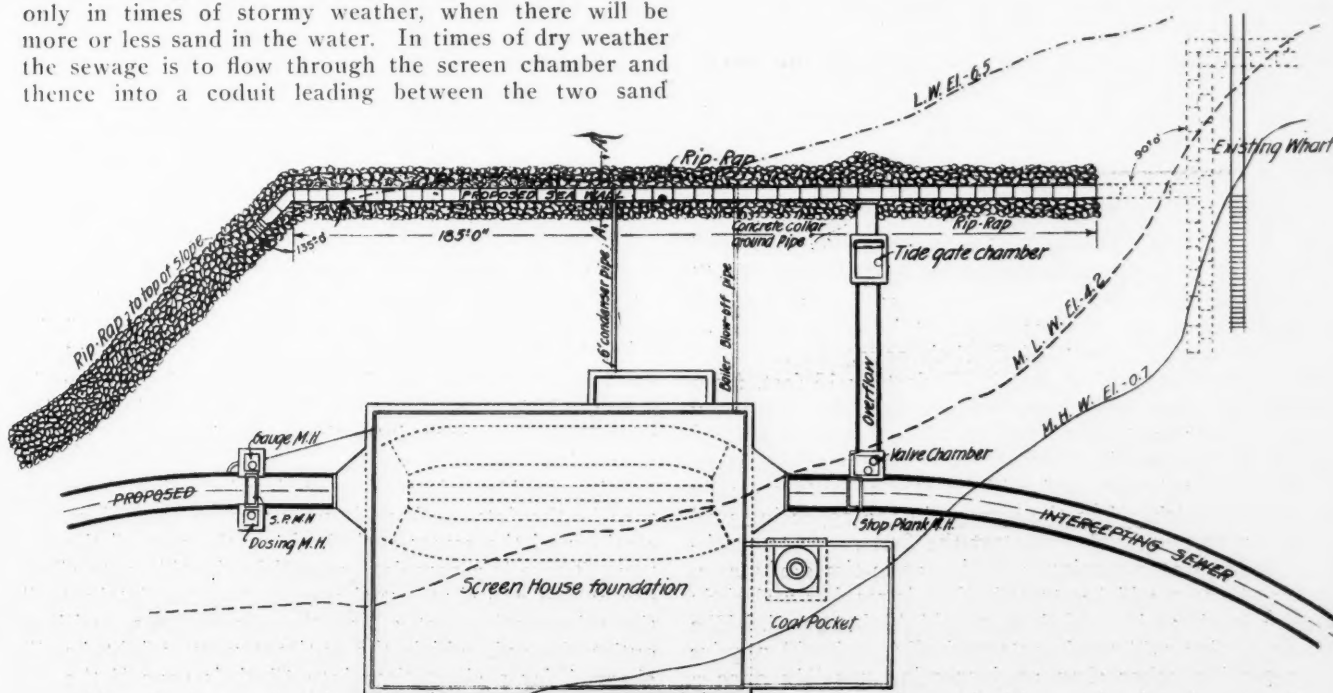
slight grade of the sewer, the problem of preventing the deposit of sand or silt in the lower sections of the sewer and in the outfall gave serious concern. It is figured that there will be a slight deposit of silt in the lower sections of the sewer during the dry weather flow, especially during the first years of its use when the flow will be rather small for the size of the conduit. At the present time, however, it will be necessary for a great deal of the rain water in times of storm to flow through the intercepting sewer, and the largely increased flow with the consequent greater velocity is expected by engineer Williams to scour out the whole sewer at each heavy rainfall. The rain water flowing through the catch-basins, however, will bring with it considerable quantities of sand, which might after a while clog the outfall pipes; and to prevent this Mr. Williams has provided for grit chambers to be built in connection with the screen house which is provided for removing the floating matter.

The total flow of the sewer will pass through the screen house, the plans for which have been completed and bids on it invited. This building will contain not only the screen chamber and the grit chambers but will have also a small power plant with a 100 horse power engine, boilers and dynamos for the generation of electricity which will be used to operate the various pumping stations, being conveyed thereto by wires running through conduits cast in the concrete of the sewer. There will be two sets of screens, the rods of which will be three-quarters of an inch apart. These screen cages, which will run in separate slides, one directly behind the other, will be seven feet high and a little over two feet in depth, and each will be counter-balanced by weights so as to be raised or lowered easily. They will be handled entirely by electric power and will be cleaned by hand, the floating matter which they collect being scraped off and compressed, in a hydraulic press, into sludge cakes, which will be incinerated under the boilers of the power plant. In order to insure as perfect consumption of this matter as possible, the boilers will have especially high fire boxes.

There will be two grit chambers of identical size and shape, so that if necessary one can be cleaned while the other is being used. These grit chambers will be used only in times of stormy weather, when there will be more or less sand in the water. In times of dry weather the sewage is to flow through the screen chamber and thence into a conduit leading between the two sand

tanks. The grit chambers and the dry weather flow conduit will each have electrically operated sluice gates at either end, so that any or all of them can be shut off at any time.

The grit chambers will each be 48 feet long, 20½ feet deep and 7 feet wide, and will have hopper bottoms. They will be placed directly behind the screen chambers, and in stormy weather the sewage flow, after passing through the screen, will drop six feet into the grit chamber and at the same time will be spread out to a considerable extent. It is expected that this sudden increase in cross-section and consequent check in the velocity will precipitate the sand and heavier matter in the hopper bottom of the tank, and that only the lighter sewage matter will be carried on through the outlet. This method has been used in other intercepting sewer systems before, and found more or less successful, the chief fault being that when the grit chambers become filled up and have to be cleaned out, the mixture of sand and decaying sewage deposited in the bottom gives off such an offensive odor that the establishment is a nuisance to the neighborhood in which it is located. To avoid this, Mr. Williams has designed a new method of taking care of the sand deposit, which he believes will do away altogether with any odor, and will make the sand fit to use for filling around the screen house, or even to be sold for use in building work. The method is essentially his own, and has never been tried with sewage systems before. By means of a sand pump, which will be operated by an electric motor, he plans to pump the sand out of the bottom of the grit chamber as fast as it collects, and to run it through a Nichols sand washer, and after it has been cleansed in this, to draw it out after to whatever place it is desired to deposit it. The Nichols washer, which has been used to good effect in cleaning the foul sand from filtration beds of the water purification plant at Philadelphia, consists of a circular tank into which the dirty sand is pumped. Here it is mixed with a plentiful supply of clean water and whirled about, the lighter particles of sewage matter staying near the top, while the heavier sand particles sink to the bottom and are drawn off by gravity to a sand pump. The lighter dirt overflows through a pipe



GENERAL PLAN OF SCREEN HOUSE AND SEA WALL.
Grit chamber and dry weather flow conduit shown by dotted lines in screen house.

at the top of the tank, and is led off into the sewer again, being introduced below the grit chamber. Mr. Williams believes that this operation can be made continuous in stormy weather, when the grit chambers will be used, and that the offensive odors of "cleaning out day" will be eliminated. An auxiliary outlet pipe connecting with a centrifugal pump will however be built at the lower end of each grit chamber so that, in the event the plan does not work, the old method can be adopted and the grit pumped out into scows after the chamber has become filled.

There has been installed a mixing room with mixing vats for the preparation of a solution of hypochlorite of lime with which the sewage may be treated later. This method has not been fully decided on as yet, but the facilities are being installed in case it becomes necessary. The hypochlorite of lime, or bleaching powder solution, will be introduced by means of a centrifugal pump and a series of nozzles spraying small jets under high pressure into the sewage, just before it leaves the screen house. This solution of lime, in addition to reducing the number of bacteria, is expected to oxidize a great deal of the sewage matter, and in order to get the best results sedimentation tanks are necessary. Provision has been made to build these if they should later seem desirable. There will be a ventilation shaft connected with the chimney to the power plant, which will draw off the foul sewer gases from the sewage both before it enters the screen chamber and after it issues from the grit chambers and goes into the sewer again. These sewer gases will be drawn up the chimney and be scattered by the wind without creating any offensive odor in the neighborhood of the screen house.

As the sewer below the screen house will be entirely below sea level, the flow will be affected a great deal by the rise and fall of the tides, and to overcome the possible sedimentation that might take place, Mr. Williams has had installed two sets of tide gates, one behind the other, which are situated in a tide gate chamber next to the outfall chamber at Fort Rodman. When the incoming tide causes a flow up into the sewer, these gates will close and will remain closed until the pressure of the pent up sewage overcomes the force of the tide and forces the gates open. The sewer will take less time to empty under this plan than if the sea water had been allowed to fill it up, and the increased velocity of the sewage, caused by the head of accumulated sewage in it, will cause a scouring out of the lower part of the sewer twice a day. The sewage under this arrangement will be discharged mostly on the ebb tide, which will help to carry it out to sea.

The intercepting sewer operates entirely by gravity, and there are certain sections of the city which are too low to drain into the main interceptor and these will be drained to pumping stations, where the sewage will be pumped up into the interceptor. One of these stations is being built at the present time to take care of a section of territory at the head of Clarke's cove. It will contain a collecting well 12 feet by 30 feet by 15 feet, from which the water will be pumped into the big sewer by a set of four centrifugal pumps. These pumps will be operated by electric current from the power station at the screen house, and will be started automatically by a float which, when the sewage in the collecting well gets to a certain level, will start the first pump to working. If the water continues to rise, as in times of storm, a second pump will be started when it reaches a slightly higher level, and a third at a still higher level. The whole station will work automatically, and will require no attention other than an inspection possibly once a week. An electric alarm will give a signal at the screen house in case of any breakdown in the machinery at the pumping station. Other stations of this kind will be

built at several other low points in the city before the system is entirely finished.

Although most of the digging south of the head of Clarke's cove has been through soft soil, composed mostly of sand, with the bottom of the trench but a short distance from the shore of the cove and some few feet below sea level, very little trouble has been experienced by the contractors on account of water in the trench. An under-drain has been put in beneath the bottom of the intercepting sewer in order to keep the trench dry, and this drain, although only twelve inches in diameter, has been more than able to take care of all the water that comes into the trench.

J. W. Bishop & Company have been using three stiff-leg derricks in their work on the portion across the U. S. government reservation. These derricks run on tracks along the side of the ditch, and one of them has been used to raise and lower buckets for the gang which is digging the ditch, while a second does the same work for the filling gang. The dirt as it comes from the ditch is dumped into Koppel cars operated by hand on a construction track, and is run to a dump or else is carried back to help fill up the trench after the sewer has been completed. The third derrick is used to lift the hopper buckets which carry the concrete. A cube mixer mounted on a flat car, which also runs on the track used by the derrick, follows up the work as it progresses, and fills one hopper bucket while the other is being emptied between the sewer forms. Blaw steel forms are being used on all parts of the sewer for centering, and the concrete for the arch is being poured quite wet. That for the invert, however, is mixed stiff enough to hold its shape, as the bottom of the sewer is hollowed out by hand, with a steel template as a gauge. The hopper buckets are so shaped that the concrete can be delivered at exactly the right place, and can be poured into a very narrow slit.

F. A. Gamino, who is doing the work on the section northerly from the screen house, is using a Carson conveyer in his excavating, and carries the dirt, as it is excavated, back to fill the trench behind where the sewer has been completed. He is using a concrete mixer mounted on a truck, and is pouring his concrete through a trough directly into the sewer forms wherever possible, and conveying it by wheelbarrow where it is impracticable to place the mixer on the edge of the trench.

The city has struck almost continuous ledge through the section where the sewer is being constructed by its own sewer gang, and air drills have had to keep constantly at work drilling holes for blasts. The gang on this section has a concrete mixer on a truck and is following Gamino's plan of pouring direct from the mixer into the trench through a flexible trough. A cable way is being used in the excavating and the filling work done by the city.

The under-drain in this section of the sewer is being used not only to drain the ditch of water, but is being laid with the idea of having the house drains which are too low to flow into the interceptor, flow into the under sewer. This line is then led to the pumping station, where it discharges into the collecting well and is pumped up into the sewer.

With the idea of possible repairs that might be necessary in the future, there is provision to cut off various sections of the sewer entirely from the rest of the system. There is a complete cut-off in the tide gate chamber, which will shut out the sea water completely, while there is another cut off at the screen house, with an outlet through which the entire sewage might be discharged for a short time into Clarke's cove if the section between the screen chamber and the tide gate chamber at Fort Rodman had to be cleaned or repaired.

TABLE NO. 1—CONSTRUCTION WORK DURING 1912.

Name of City.	Streets				Water Works					Sewerage				Total of all construction work.
	Grading.	Pave-ments.	Side-walks, curbs and gutters.	Other street construction.	Mains.	Meters.	Pump-ing plants.	Reser-voirs.	Other construction.	Mains and appurtenances.	Pump-ing plants.	Treat-ment plants.	Other construction.	
Alabama:														
Dothan	a		\$500		4,000 ft.		\$15,000	\$10,000	\$45,000	\$500	None	None	\$4,000	\$54,000
Gadsden	\$10,000		9,000	\$4,000	\$25,000	\$6,000								
Jasper			4,000							8,000				
Troy			24,000											
Arizona:														
Nogales	560		150		60,000b									60,710
Phoenix		125,000	25,000							325,000				475,000
California:														
Fresno	36,733	117,215g	9,078							10,477				
San Bernardino	2,000	45,000	20,000	7,500	45,000b					5,000				129,000
Visalia	2,000		800	2,500	e					500	400			5,200
Colorado:														
Fort Collins	3,500	None	4,000	16,000	6,200	300				275				16,000
Grand Junction		75,000	5,000		10,900				450,000	3,000				543,000
Connecticut:														
Ansonia	400	\$4,200	3,750							60,000				
Derby	1,300	7,800	1,600	2,000										12,700
Hartford	21,000	60,218		45,000						70,000	\$66,000			
Putnam	3,000	1,500								20,000				
Southington	3,500	12,000	17,000		34,000	800								
Wallingford	3,000	22,000	2,000		6,000	200		5,000		8,000				
Florida:														
Sarasota	676		5,000		1,500	60				200				
Georgia:														
Americus					1,000	780				40,000				41,780
Gainesville		78,283	1,700		600	750				5,000				
Moultrie	2,000	200	100	1,500	None	900			3,000					6,500
Waynesboro	1,500		32,000			400	1,100							36,400
Idaho:														
Boise		5,771	4,718		e					54,370				
Illinois:														
Alton	5,000	6,000	1,000	29,000c										96,006
Bloomington		19,371	21,110		10,224	4,740				9,396				
Carlinville	1,000	18,000	5,000	1,000				3,000					1,500	30,000
East St. Louis	13,000	78,700	38,100	2,400						44,500				176,700
Galena		13,275	4,240		4,000					970			60	
Greenville	150	None		1,100	2,000									8,250
Lake Forest		18,000			500									
Marion			106,423											
Marengo										5,000				
Mattoon	None	87,000	1,200	None	7,500					8,000				
Moline		198,435	28,771		24,259					16,823				268,288
Normal		18,000	6,000		3,000	50	9,000	3,400	2,800	3,000				
Oak Park		116,000d	36,500		12,500	2,500	12,000		7,500	1,800				480,800
Pekin		136,288	6,470	12,100									497	
Rock Island		106,000			52,500					33,000				
Streator	200	43,000	5,000							2,000				52,200
Taylorville		29,520	38,000		1,500	150			500	1,000				50,000
Waukegan	4,460	30,150	10,570		800	700			1,500	25,000				75,952
Indiana:														
Bedford					None	40	900	16,300						
Bloomington	3,500	32,000	11,000	4,000	3,366			175		9,400				63,441
Boonville										54,560				54,560
Crawfordsville	12,430	16,330	8,000	18,000						5,000				54,760
Evansville		156,000d	3,000		36,000		100,000		50,000	16,500				
Fort Wayne	1,600	287,632	31,467	3,375	22,567	60,270				30,808				457,870
Logansport		38,500	5,000	2,000	1,200					500				47,200
Plymouth	800		750		1,200	400				950				
Portland	1,597	15,020	3,100		1,500					8,000			2,200	
Richmond		51,620	31,800							17,568				100,988
Iowa:														
Burlington	15,000	70,000	12,500	4,000	e					50,000				
Cedar Falls	6,500	156,678	7,500		4,540	625	11,150			3,932				190,925
Creston		105,000								2,450				107,950
Fairfield	5,000	60,000	3,000		2,500	500			16,000	55,000	\$15,000			
Indianola	259		1,639		969	375		15,000	2,000	38			6,000	30,480
Lake City						1,000								
Marengo			3,500		450			2,800						6,750
Muscatine	9,000	28,500	16,100	175,000					36,000	4,000				274,600
Kansas:														
Belleville			2,000						2,500					
Fort Scott	300	27,000	3,000					500	1,000	3,600				38,400
Great Bend	2,000		2,500											
Manhattan		120,000	10,000		20,000	150								
Osawatomie	1,000	5,000	3,500	1,500		465								
Pittsburg		71,100	9,550		36,000					5,200				31,465
Salina		32,524d	2,000	2,500						8,000				
Topeka	20,000	124,000	34,000		16,000	12,000	35,000							
Kentucky:														
Dayton		5,000								1,000				
Louisville		502,160	26,600	34,944	204,000		16,000			150,975				
Ludlow	621	889	953	1,548						2,500				
Owensboro	4,500	30,000	10,000							5,400				
Maine:														
Pittsfield		5,800	1,000		275		50	50	500	600			100	8,375
Maryland:														
Baltimore		800,000	50,000				1,000,000		2,000,000					
Massachusetts:														
Everett		20,326	27,361	11,050	31,406	2,800							13,814	
Greenfield	20,000	8,000	7,500							9,000				
Lowell	5,000	72,750	5,000	30,000	25,000	9,000		100,000		50,000				350,000
Westfield	3,000	40,460	9,500		5,000					7,800				

For footnotes see page 17.

TABLE NO. 1—CONSTRUCTION WORK DURING 1912.—(Continued).

Name of City.	Streets			Other street construction.	Water Works				Other construction.	Sewerage			Other construction.	Total of all construction work.
	Grading.	Pave-ments.	Side-walks, curbs and gutters.		Mains.	Me-ters.	Pump-ing plants.	Reser-voirs.		Mains and ap-purten-ances.	Pump-ing plants.	Treat-ment plants.		
Michigan:														
Alma		39,000	2,000		3,500	250								47,750
Cadillac	3,100	3,000	2,775	1,280						12,000				22,155
Escanaba	1,250	17,750	4,300							2,100				26,650
Grand Rapids	99,811	131,038			55,000	10,000				83,680	15,000		370,675	880,504
Hillsdale		17,000			5,000					2,500				
Minnesota:														
Bemidji	2,264	22,644	840		2,807					621				30,176
Mankato	2,000	18,000	9,000	1,500	3,000	500			300	16,000		2,500		39,400
Minneapolis	293,000	540,000	182,000	128,000	195,000				275,000	650,000				2,263,000
Montevideo	500		2,000	2,000	1,000	114			300	160				6,074
South St. Paul	20,748	16,734	3,243	1,526	6,887									49,139
Winona		5,000	4,860	1,500										
Mississippi:														
Port Gibson	600													
Vicksburg	6,549	73,781	8,513		7,988					6,708				
Missouri:														
Aurora	3,000		1,000											4,000
Boonville														3,000
Columbia	5,852	34,903	8,983							11,403				61,142
Fulton	1,727	12,678	9,892	1,168	1,267				4,000	786				32,368
Hannibal	2,820	123,000	16,896	2,000	e					25,000				
Kansas City	187,031	538,800	128,570	75,000	325,000		250,000			605,316	44,000		15,000	2,238,717
Kirksville		13,988	2,000	100		560			300	6,000				38,549
Liberty	3,024	51,100	11,430		1,000		8,000							75,554
Sedalia	5,000	28,000	25,500		e					40,000		12,000	500	171,000
Webb City	3,000	1,000	1,200							500				6,100
Montana:														
Bozeman			4,000		1,050					1,000				
Nebraska:														
Blair														18,000
Norfolk	2,500		4,000			175	2,500			4,000			3,500	16,500
Tecumseh			2,000		13,000	1,500	2,000	6,000	4,000	16,000				44,500
New Hampshire:														
Laconia	4,000	5,000	3,000	8,000						5,000				
New Jersey:														
Bayonne	1,500	146,000	38,700		13,800				500	4,000				204,500
Elizabeth	1,072	157,560		15,403						30,898				312,976
Long Branch		10,000		20,000										
Newark	f	825,636	71,000							200,000			45,000	
Passaic	8,740	136,348	5,518	2,908						11,070				164,584
Rahway		28,000		15,000	5,000					6,250				54,250
Vineland							1,300						1,200	22,500
New Mexico:														
Albuquerque		85,000			e					9,000				94,000
New York:														
Binghamton		37,831	17,076	9,692				66,000		46,261				176,859
Carthage	200		800		1,000		1,500							
Hudson			3,000							2,500			200	5,700
Jamestown	10,000	90,000	20,000	30,000	30,000	10,000		60,000		15,000				270,000
Niagara Falls		300,000			50,000					25,000				375,000
Syracuse	18,000	151,864	17,000	23,000	35,000	10,000			10,000	102,224				
White Plains	500	30,000	25,000							4,000	5,000			
Watertown		15,000	22,000	20,000					15,000	30,000				
North Carolina:														
Greensboro	500	50,000	6,000		4,000	600				7,000		3,000		71,100
Wilson					1,500	150				750				
North Dakota:														
Bismarck	10,000			1,500	e					7,000	1,200			19,700
Dickinson			10,000			248			1,100					20,015
Valley City	3,000		3,500	3,000	1,000	300								10,800
Ohio:														
Bellevue		29,000												
Bowling Green	2,500	14,000	5,600		2,000	200				500				
Canton	22,000	386,000	29,200	26,000	180					35,000				
Delaware		30,000												
Mansfield		1,200								18,000				19,900
Miamisburg	1,000	2,000	2,000											23,000
Norwalk		4,600			4,500			1,000		500				
Oberlin		26,500			1,100				9,000	1,000				
Pomeroy		11,000	2,000											13,000
Ravenna			1,000		6,000	7,320				75,000			91,000	
Springfield	43,063	94,500	20,200		20,000	2,800				321,622				502,185
Warren			11,000							17,500				
Oklahoma:														
Altus		200,000											500	
Chandler			3,000		20,000	500								
Clinton	5,000		1,000		4,000	1,000			3,000					39,000
Durant		17,400	4,000	1,000		1,200				200			500	24,300
El Reno	1,500		7,000	1,500	2,700	3,000				1,500				34,700
Okmulgee	3,600	18,000	5,000		1,500	2,000							5,000	
Tulsa	20,000	130,000	9,000	40,000	16,000	200	28,000		8,000	75,000				
Oregon:														
Grants Pass	9,000	37,000	6,700							5,000				57,700
McMinnville		45,000	7,500		15,000					1,000				68,500
Pennsylvania:														
Du Bois		13,769	2,982		3,846	1,088				2,430				
Franklin		13,755												
Harrisburg	3,000	130,000	42,000							80,000				260,000
Hollidaysburg		15,000	1,000	2,000										
McKeesport		75,275								10,852				92,327
Meadville		9,450	10,000					3,000		1,500				22,900
New Brighton	400	1,000	2,000	1,000						600				7,000
Norristown	2,000	19,200	6,000		e					4,500				

For footnotes see page 17.

TABLE NO. 1—CONSTRUCTION WORK DURING 1912.—(Continued).

Name of City.	Streets			Water Works					Sewerage				Total of all construction work.	
	Grad-ing.	Pave-ments.	Side-walks, curbs and gutters.	Other street construction.	Mains.	Me-ters.	Pump-ing plants.	Reser-voirs.	Other construction.	Mains and appurtenances.	Pump-ing plants.	Treat-ment plants.		Other construction.
Pennsylvania (Continued):														
Philadelphia										870,300				
Shamokin		4,000			e	4,562				12,800				36,566
Sharpsville		19,194								3,000				25,000
Warren		14,000	8,000							10,000				123,500
Wilkes-Barre		106,000	7,500		e									
Rhode Island:														
Cranston		30,000												
Woonsocket			1,000						7,000					
South Carolina:														
Charleston		30,000	15,000											
Chester		10,000								500				10,500
Columbia		150,000d	16,500	30,000					30,000					
South Dakota:														
Aberdeen			15,000		15,000			20,000		1,100		65,000	10,000	126,100
Mitchell	3,500	39,000	7,000	1,500	9,850	8,000				6,800				
Texas:														
Brownsville	5,000	75,000	10,000		7,000				15,000	12,000				
Bryan			3,000		30,000	3,000	40,000	7,000	3,000	13,000				96,300
El Paso		119,364												
Paris		100,000	20,000	8,000			2,500	12,000		1,000				
Utah:														
Ogden	25,000	28,000	20,000		6,000					8,000				
Washington:														
Aberdeen	169,504	89,361	17,206	26,670	17,940	1,450			3,200	14,249				350,082
Hoquiam	20,000	25,000								5,000				50,000
Wisconsin:														
Appleton	4,600	12,100	21,390	3,000	90,000	1,200				11,000				
Baraboo	2,400	5,500	1,800		2,050	65			600	2,200				15,515
Chippewa Falls		22,500												
Fort Atkinson	2,000		1,000	1,000	1,000		1,000			4,000				14,000
Kenosha	12,000	329,000	10,000		7,000	200		8,000		190,000				
Two Rivers		33,000		2,000	2,000				2,000	4,500				
Waukesha	4,386	27,660	10,000		14,000	1,078	1,100			3,607				64,331

a.—Grading done by city employees. b.—Includes all water works construction. c.—Repairing streets after heavy cloud-burst. d.—Includes grading. e.—Private water company. f.—Included under sidewalks. g.—Includes curbs and gutters.

TABLE NO. 3—FORECAST OF WORK TO BE DONE IN 1913

Name of City.	Streets			Water Works					Sewerage				Total of all construction work.	
	Grad-ing.	Pave-ments.	Side-walks, curbs and gutters.	Other street construction.	Mains.	Me-ters.	Pump-ing plants.	Reser-voirs.	Other construction.	Mains and appurtenances.	Pump-ing plants.	Treat-ment plants.		Other construction.
Alabama:														
Dothan													\$9,000	
Gadsden	\$10,000		\$5,000	\$3,000		\$1,000								\$19,000
Jasper			4,000										15,000	
Troy					\$28,000									
Arizona:														
Nogales	1,000		300							\$50,000a				54,800
Phoenix		\$300,000	75,000											375,000
California:														
Fresno	50,000	100,000	10,000							10,000				
San Bernardino	1,500	150,000	12,000	1,500						30,000				270,000
Visalia	30,000	50,000	5,000							1,000				86,000
Colorado:														
Fort Collins	1,000	6,300	4,000	2,000					\$3,000	1,500				25,000
Grand Junction		50,000	10,000		5,000									65,000
Connecticut:														
Ansonia		25,000								20,000				
Derby		4,000	2,000											6,000
Hartford	22,000	50,000		45,000										
Southington	2,000	5,000	10,000		5,000	500		\$2,000						
Wallingford		44,000	2,000		3,000	250				40,000				
Florida:														
Sarasota		45,000			15,000				15,000	15,000			15,000	90,000
Georgia:														
Americus		2,000	10,000	600		750				10,000				23,350
Moultrie						450								
Idaho:														
Boise	150,000		48,000							4,140				
Illinois:														
Alton	150,000													
Bloomington		115,020	23,220		48,120					20,674				
Carlinville	1,000	25,000	5,000	2,000									1,500	35,500
East St. Louis	90,000	375,000	105,000	25,000						400,000				995,000
Greenville	100	10,000												
Lake Forest		25,000	3,500		1,500									
Mattoon		150,000	1,200		4,000					50,000		\$20,000		
Moline		150,000	25,000	92,000	90,000	20,000	\$33,000	53,000		90,000	\$4,000	15,000		572,000
Normal		30,000	4,000		2,000	30				2,500				
Oak Park		165,000b	22,500		37,000	4,000			7,000	2,000				
Rock Island		200,000			70,000					30,000				
Taylorville			38,000											
Waukegan	12,000	100,000	20,000		1,500	700				6,000				210,200

For footnotes see page 17.

TABLE NO. 3—FORECAST OF WORK TO BE DONE IN 1913.—(Continued).

Name of City.	Streets				Water Works				Other construction.	Sewerage			Other construction.	Total of all construction work.
	Grading.	Pave-ments.	Side-walks, curbs and gutters.	Other street construction.	Mains.	Me-ters.	Pump-ing plants.	Reser-voirs.		Mains and ap-purten-ances.	Pump-ing plants.	Treat-ment plants.		
Indiana:														
Bedford										20,000				
Bloomington	5,000	60,000	20,000	5,000						15,000				105,000
Boonville										75,000				
Crawfordsville	2,500	10,000	3,000	3,000						10,000				28,500
Evansville	100,000c				40,000					16,000				364,000
Fort Wayne	2,000	250,000	30,000	7,000	15,000	10,000				45,000				63,500
Logansport				2,000	1,000				60,000	500				
Plymouth		30,000	1,600		1,000					4,000				
Portland	2,500d	30,000	6,000		1,500					10,000				
Richmond		60,000	8,500							36,400				104,900
Iowa:														
Burlington	10,000	100,000	15,000							25,000				150,000
Cedar Falls		12,000			3,500	1,000								
Indianola									2,000					
Muscatine	9,500	25,000	15,000		35,000			25,000		7,000				121,500
Kansas:														
Belleville									2,500					
Fort Scott	300	20,000	3,000		3,000			1,000		100,000				128,100
Great Bend	3,000		2,500											
Manhattan		60,000	5,000		10,000	100								
Osawatomie	2,500	20,000	3,000	1,500		300	500		1,500					29,300
Pittsburg		70,000	18,000	10,900						5,000				
Salina		15,000	2,000							5,000				
Topeka	15,000	100,000	30,000		17,000	2,500		15,000		25,000				
Kentucky:														
Dayton		30,000								3,000				
Louisville		750,000	30,000	40,000	300,000		20,000			1,000,000				
Ludlow	1,500	20,000	2,400							10,000				
Owensboro	3,500	15,000	6,000							2,000				
Maine:														
Pittsfield		5,000	1,000		500				100	1,000			100	7,700
Saco	7,000													
Maryland:														
Baltimore		1,200,000	70,000				2,500,000		2,000,000					
Massachusetts:														
Lowell	5,000	75,000	5,000	35,000	50,000	10,000				50,000				400,000
Westfield		40,000	8,000		5,000	500				6,000				
Michigan:														
Cadillac	1,500	16,800	2,100	3,000						17,000				40,400
Escanaba	500	14,000	1,400							87,000		30,000	3,000	135,900
Grand Rapids	100,000	130,000			35,000	10,000				80,000				405,000
Hillsdale		15,000			3,000					2,000				
Minnesota:														
Bemidji	2,000	15,000	2,000						7,000	3,000				29,000
Mankato	3,500	25,000	4,000	2,000	2,000	300				1,000				
Minneapolis		600,000	230,000		150,000					650,000			5,000	
Montevideo	600		2,000	1,500	1,000	160				700				
South St. Paul	25,000		4,000		7,000									6,460
Winona	1,000	48,000	1,000							5,000				36,000
Mississippi:														
Port Gibson					800									
Vicksburg	5,100	8,200	4,210		8,020					2,200				
Missouri:														
Eldorado Springs					1,000					1,000				
Fulton	164	3,426	3,000		1,500									
Hannibal	3,000	150,000	10,000	5,000						120,000				
Kansas City	205,000	550,000	135,000	90,000	300,000		125,000			950,000				2,415,000
Kirksville		24,000	5,000	200		400			500	3,000		500		60,000
Liberty	7,000	50,000	10,000					9,000						76,000
Sedalia	3,500	30,000	20,000							15,000		16,000		
Webb City	5,000	10,000	4,000							7,500				26,500
Montana:														
Lozeman		100,000	10,000		2,000					5,000				
Nebraska:														
Norfolk	3,000	75,000	4,000			200	5,000		10,000				3,000	100,000
Tecumseh	2,500		3,000		600									7,300
New Hampshire:														
Laconia	4,000	10,000	3,000							5,000				
New Jersey:														
Mayonne	8,000	175,000	40,000		10,000					10,000				243,000
Dover		55,000												
Elizabeth		150,000								30,000				60,000
Long Branch		200,000		20,000										
Newark		1,000,000	100,000b											
New Mexico:														
Albuquerque		75,000								3,000				78,000
New York:														
Binghamton		40,000	20,000	10,000						40,000				110,000
Carthage		18,000												26,000
Hudson		35,000	10,000											45,000
Jamestown	10,000	90,000	20,000	30,000	150,000	10,000	50,000			25,000				400,000
Niagara Falls		300,000			25,000					25,000				350,000
Syracuse	24,000	300,000	17,000	25,000	35,000	10,000			10,000	106,000				
Watertown		45,000	25,000	20,000					15,000	40,000				
North Carolina:														
Greensboro	1,000	30,000	8,000		10,000	1,000	4,000			7,000				61,000
Wilson		80,000												155,000
North Dakota:														
Bismarck	15,000			3,000						3,500				21,500
Dickinson	2,000		2,000		1,000	30				800				
Valley City	3,000		3,500	3,000	5,000	300				75,000				89,800

For footnote see page 17.

TABLE NO. 3—FORECAST OF WORK TO BE DONE IN 1913.—(Continued).

Name of City.	Streets				Water Works				Other con- struc- tion.	Sewerage			Other con- struc- tion.	Total of all con- struc- tion work.	
	Grad- ing.	Pave- ments.	Side- walks, curbs and gutters.	Other street con- struc- tion.	Mains.	Me- ters.	Pump- ing plants.	Reser- voirs.		Mains and ap- purten- ances.	Pump- ing plants.	Treat- ment plants.			
Ohio:															
Bowling Green ...	1,500	8,000	3,000	.....	3,000	200	.....	.....	.....	25,000	.....	.....	.....	.....
Canton.....	31,000	486,000	42,000	.....	58,000	380	.....	.....	.....	50,000	.....	200,000	.....	.....
Delaware.....	.....	18,000	.....	10,000	.....	.....	.....	.....	.....	15,000	.....	25,000	.....	.....
Mansfield.....	.....	66,000	.....	.....	.....	.....	.....	.....	.....	20,000	.....	.....	.....	.....
Miamisburg.....	.....	15,000	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Oberlin.....	.....	.....	.....	.....	1,000	.....	4,000	.....	1,000	2,000	.....	.....	.....	.....
Pomeroy.....	.....	20,000	3,000	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	23,000
Ravenna.....	.....	23,000	1,000	.....	3,000	400	2,500	.....	.....	2,500	.....	7,500	3,000	.....
Springfield.....	.....	426,032 ^b	30,000	.....	.....	3,000	70,000	.....	.....	95,865	.....	.....	.....	624,897
Warren.....	.....	60,000	.....	.....	.....	.....	.....	.....	.....	10,000	.....	.....	.....	90,000
Oklahoma:															
Chandler.....	.....	.....	8,000	.....	5,000	1,000	.....	.....	5,000	.....	.....	.....	.....	.....
Clinton.....	5,000	.....	3,000	.....	.....	1,000	.....	.....	.....	.....	.....	.....	.....	.....
Durant.....	.....	75,000 ^b	5,000	2,000	1,000	.....	.....	.....	500	1,000	.....	.....	.....	84,500
El Reno.....	2,500	.....	5,000	2,000	3,000	2,500	.....	.....	.....	20,000	.....	.....	3,700	56,200
Okmulgee.....	3,000	100,000	20,000	.....	3,000	2,000	.....	10,000	5,000	.....	.....	.....	5,000	.....
Tulsa.....	25,000	150,000	9,000	20,000	30,000	1,000	.....	.....	6,000	100,000	.....	.....	.....	.....
Oregon:															
Grants Pass.....	7,000	35,000	12,000	.....	.....	.....	.....	.....	.....	15,000	.....	.....	.....	69,000
McMinnville.....	.....	100,000	12,000	.....	5,000	.....	.....	.....	.....	.....	.....	.....	.....	117,000
Pennsylvania:															
Du Bois.....	.....	22,000	1,500	.....	5,000	1,200	.....	2,000	.....	3,000	.....	400	.....	.....
Farrell.....	.....	35,000	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Franklin.....	.....	15,000	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Harrisburg.....	5,000	120,000	35,000	.....	.....	.....	.....	.....	.....	30,000	.....	.....	.....	545,000
Hollidaysburg.....	.....	8,000	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
McKeesport.....	.....	52,000	.....	.....	.....	.....	.....	.....	.....	12,000	.....	.....	.....	.....
Meadville.....	.....	5,000	7,500	.....	.....	.....	.....	.....	.....	3,000	.....	.....	.....	25,500
New Brighton.....	5,000	5,000	2,000	1,000	.....	.....	.....	.....	.....	.....	.....	20,000	1,000	35,500
Norristown.....	2,000	13,000	4,000	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
North East.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	10,000	.....	.....
Philadelphia.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	800,000	.....	.....	.....	.....
Wilkes Barre.....	.....	75,000	7,500	.....	.....	.....	.....	.....	.....	100,000	.....	.....	.....	182,500
Rhode Island:															
Cranston.....	.....	40,000	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
South Carolina:															
Charleston.....	.....	90,000 ^f	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
South Dakota:															
Aberdeen.....	.....	5,000	10,000	.....	.....	.....	7,500	.....	.....	.....	10,000	25,000	.....	157,500
Mitchell.....	.....	.....	9,000	1,500	1,000	.....	.....	.....	.....	1,500	.....	.....	.....	.....
Texas:															
Brownsville.....	.....	20,000	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Bryan.....	40,000	.....	5,000	.....	2,000	2,000	.....	5,000	3,000	2,000	.....	.....	.....	59,000
El Paso.....	50,000	249,330	.....	.....	.....	.....	.....	.....	200,000	150,000	.....	.....	.....	.....
Paris.....	.....	150,000	25,000	9,000	25,000	.....	5,000	.....	.....	22,000	.....	.....	.....	.....
Utah:															
Ogden.....	10,000	100,000	20,000	.....	25,000	.....	.....	100,000	.....	50,000	.....	.....	.....	.....
Washington:															
Aberdeen.....	95,000	165,000	22,000	17,000	20,000	1,800	10,000	.....	65,000	85,000	.....	.....	.....	.....
Hoquiam.....	.....	250,000	.....	.....	.....	.....	.....	.....	.....	30,000	.....	.....	.....	280,000
Wisconsin:															
Appleton.....	5,000	25,000	20,000	5,000	.....	.....	60,000	.....	70,000	.....	.....	.....	.....	.....
Baraboo.....	3,000	6,000	2,000	600	2,000	60	.....	.....	400	3,000	.....	.....	.....	17,060
Chippewa Falls.....	.....	10,000	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Fort Atkinson.....	.....	12,000	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Kenosha.....	18,000	450,000	10,000	.....	15,000	350	.....	.....	45,000	30,000	.....	.....	.....	.....
Two Rivers.....	.....	22,000	.....	2,000	.....	.....	.....	.....	.....	3,000	.....	.....	.....	10,000
Waukesha.....	5,000	35,000	15,000	.....	10,000	1,000	.....	.....	.....	4,000	.....	.....	.....	82,500

a—Includes all sewerage work.
b—Includes grading.
c—Includes paving curb and gutter.

d—Does not include work done by street commissioner.
e—Private water company. Information refused.
f—Includes grading, sidewalk, curb and gutter.

TABLE NO. 2.—APPARATUS PURCHASED IN 1912.

Name of city.	For street construction.		For street cleaning.		
	Rollers, graders, and other horse-drawn appliances.	Shovels and other hand implements.	Carts, flushers and other horse-drawn appliances.	Hand brooms and other hand implements.	For other purposes.
Alabama:					
Gadsden	\$500	....	....	\$100	....
Jasper	1,000	....	....	....	....
California:					
San Bernardino.	100	115	750	36	....
Visalia .....	....	450	....	....	....
Colorado:					
Fort Collins .....	....	\$300	....	50	....
Connecticut:					
Hartford .....	....	3,000	....	500	....
Wallingford	1,500	....	....	....	....
Florida:					
Sarasota .....	....	....	\$900	100	....
Georgia:					
Gainesville .....	....	....	300	50	....
Moultrie	250	150	....	....	\$2,000
Waynesboro .....	....	125	....	....	....
Illinois:					
Mattoon	250	....	....	....	....
Oak Park	1,000	25	400	20	....
Pekin .....	....	....	....	50	....
Rock Island .....	....	1,500	....	....	....
Indiana:					
Bloomington .....	....	....	1,000	....	....
Crawfordsville..	....	500	....	....	....
Evansville	5,800	....	20,000	....	....
Fort Wayne	1,575	....	....	....	4,200
Logansport	1,000	200	....	100	....
Iowa:					
Creston	600	....	....	....	....
Indianola .....	....	....	250	200	....
Marengo	550	....	....	....	....
Muscatine	600	....	....	....	....
Kansas:					
Belleville .....	....	25	....	....	....
Fort Scott .....	....	....	100	....	....
Osawatomie	500	50	....	....	....
Salina .....	....	250	....	100	....
Kentucky:					
Louisville	10,000	....	3,000	....	....
Owensboro	1,000	50	800	....	....
Maine:					
Pittsfield .....	....	50	....	....	....
Michigan:					
Alma	500	....	....	....	....
Cadillac	125	....	....	75	....
Grand Rapids...	....	25	....	25	....
Minnesota:					
Bemidji .....	....	120	590	198	....
Mankato	100	40	....	50	....
Mississippi:					
Port Gibson....	200	....	100	....	....
Missouri:					
Columbia	500	....	....	100	....
Fulton .....	....	100	222	....	1,300
Hannibal	2,600	200	1,000	50	....
Kansas City....	13,000	....	6,000	....	....
Kirksville	125	150	....	....	....
Sedalia .....	....	150	....	....	....
Montana:					
Bozeman .....	....	....	1,300	100	....
New Hampshire:					
Laconia	500	100	....	55	....
New Mexico:					
Albuquerque...	....	....	400	75	....
New York:					
Hudson .....	....	200	1,200	....	....
Syracuse .....	....	2,000	....	1,000	....
Jamestown	2,000	....	1,000	....	....
Niagara Falls..	....	....	....	....	2,500
Watertown	4,000	....	1,500	....	....
North Dakota:					
Bismarck	350	75	....	....	....
Dickinson	660	25	....	....	....
Ohio:					
Canton	2,500	....	1,800	....	....
Miamisburg .....	....	....	....	1,000	....
Pomeroy	600	....	....	....	....
Ravenna .....	....	150	200	100	....
Oklahoma:					
Clinton	675	150	....	....	....
El Reno	1,000	....	....	....	....
Okmulgee	1,000	150	....	50	....
Tulsa	300	....	1,600	50	....
Oregon:					
Grants Pass....	1,000	....	....	....	....
Pennsylvania:					
Harrisburg .....	....	....	....	1,000	....
Norristown .....	....	....	1,150	....	....
South Carolina:					
Columbia .....	....	....	1,200	50	....
South Dakota:					
Mitchell .....	....	....	250	....	....
Texas:					
Brownsville....	....	....	900	....	....
Bryan .....	....	1,000	1,000	....	....
Paris	800	250	....	....	....
Utah:					
Ogden	300	100	250	....	....
Washington:					
Aberdeen .....	....	500	....	100	....
Hoquiam .....	....	....	1,500	....	....
Wisconsin:					
Appleton .....	....	200	200	....	....
Fort Atkinson...	....	....	300	....	....
Waukesha .....	....	....	400	....	....

TABLE NO. 4.—FORECAST OF PURCHASES IN 1913.

Name of City.	For street construction.		For street cleaning.		For other purposes.
	Rollers, graders and other horse-drawn apparatus.	Shovels and other hand implements.	Carts, flushers and other horse-drawn appliances.	Hand brooms and other hand implements.	
Alabama:					
Gadsden .....	....	....	....	50	....
California:					
San Bernardino. ....	....	100	....	50	....
Colorado:					
Fort Collins....	....	1,000	....	....	....
Grand Junction.	2,500	....	....	....	....
Connecticut:					
Hartford .....	....	3,000	....	500	....
Wallingford ....	....	....	250	....	....
Florida:					
Sarasota	1,000	....	....	....	....
Illinois:					
Mattoon .....	....	....	....	6,000	....
Oak Park	1,000	50	....	25	....
Rock Island.....	....	....	1,000	....	....
Indiana:					
Crawfordsville . ....	....	500	....	....	....
Evansville .....	....	....	25,000	....	....
Logansport	1,000	200	....	100	....
Richmond .....	....	....	1,200	....	....
Iowa:					
Indianola .....	....	....	250	....	....
Kansas:					
Fort Scott.....	....	....	100	....	....
Osawatomie.....	500	....	....	....	....
Salina .....	....	300	1,000	125	....
Kentucky:					
Louisville .....	....	....	3,000	....	....
Maine:					
Pittsfield	500	50	....	....	....
Michigan:					
Cadillac	1,800	....	....	75	....
Grand Rapids... ..	....	25	....	25	....
Missouri:					
Fulton .....	....	100	....	....	....
Kansas City....	15,000	....	5,000	....	....
Kirksville .....	....	100	....	....	....
Sedalia .....	....	100	....	....	....
Montana:					
Bozeman .....	....	....	....	100	....
New Hampshire:					
Laconia	600	100	....	75	....
New Mexico:					
Albuquerque ... ..	....	....	1,000	....	....
New York:					
Binghamton ....	....	....	2,500	....	....
North Dakota:					
Bismarck	200	50	....	....	....
Dickinson	500	....	....	....	....
Ohio:					
Canton	2,000	....	....	....	....
Miamisburg	300	....	....	200	....
Oberlin	400	....	....	....	....
Oklahoma:					
Durant .....	....	....	....	....	5,000
El Reno.....	1,500	....	....	....	....
Okmulgee	500	50	1,000	150	....
Pennsylvania:					
Harrisburg .....	....	....	....	1,000	....
Texas:					
Bryan .....	....	500	500	....	....
Paris	1,500	120	250	....	....
Washington:					
Aberdeen	200	650	1,050	100
Hoquiam	1,000
Wisconsin:					
Appleton	1,500	500	200
Waukesha	400

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CHANGE OF ADDRESS

Subscribers are requested to notify us of changes of address, giving both old and new addresses.

Contributions suitable for this paper either in the form of special articles or of letters discussing municipal matters, are invited and paid for. Subscribers desiring information concerning municipal matters are requested to call upon MUNICIPAL JOURNAL, which has unusual facilities for furnishing the same, and will do so gladly and without cost.

JANUARY 2, 1913.

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Immunization Against Typhoid Fever.

For some time occasional more or less authentic reports have appeared in the daily press referring to immunization against typhoid fever by inoculating a healthy person with sterilized typhoid cultures, but the average reader is probably doubtful as to the truth of the claimed efficacy of this treatment as a prophylactic. The Department of Health of New York City has issued a bulletin in which it states that "practically all authorities now agree that the practice offers a notable immunity against typhoid infection, and reduces by three fourths the number of cases of typhoid fever occurring among persons who have been so immunized. Under similar conditions typhoid fever occurring in immunized persons is, approximately, only one-half as fatal as in persons not so protected. Typhoid fever thus is less apt to occur, and when it does occur runs a milder course among the sick who have been immunized than among those who have not."

This Board of Health on December 10, 1912, authorized its inspectors to inoculate against typhoid fever un-

der conditions similar to those governing the free administration of diphtheria antitoxin; and beginning January 1st, inoculation will be made at the homes of applicants or at the office of the department; or the cultures will be furnished free to physicians for their own use.

"As at least 10 per cent. of the cases of typhoid fever occurring in New York City are thought to be due to contact, immediate or indirect, with a preceding case in the same locality, and not to infected water or milk, it is hoped that a widespread immunizing of the members of all families in which a case of typhoid fever occurs will sensibly reduce the occurrence of typhoid fever in New York City."

Special Sprinkling Hydrants.

In an excellent paper giving details concerning the methods and costs of sprinkling streets in St. Paul, which is printed elsewhere in this issue, one statement is made which we cannot permit to pass unchallenged. The author maintains that sprinkling carts should be filled from fire hydrants and that special hydrants or pipes should not be used for this purpose. We doubt whether the use of fire hydrants is more economical, when consideration is had of the damage done to them by sprinkling cart drivers where they are so used. There might be some weight to the author's argument if the wetting of streets was the only objection to using fire hydrants; but a much more serious objection to this use is the fact that it is almost invariably found in cities where this is permitted that the drivers damage many of the hydrants, or leave them only partly closed and leaking through the drip; in many cases so injuring them that they are found useless when the emergency of a fire—their legitimate and by far their most important use—arrives. We certainly hope that the St. Paul Water Department will continue to be successful in preventing the use of the fire hydrants by the Department of Public Works.

Brick and Stone Block Paving.

Editor Municipal Journal,
50 Union Square, New York, N. Y.
Dear Sir:

Your issue of Municipal Journal for December 26, 1912, contained at least three articles of such interest to me that I am unable to refrain from addressing you concerning them. The first article was "Pavement Testing in Detroit," and the third one was your editorial on "Uniformity of Paving Brick."

I have long held that more deterioration of properly laid brick pavements came from excessive variation between the wearing qualities of the individual brick than from any other cause, and for many years, as Chief Engineer to the Maryland Geological and Economic Survey (and later to the State Roads Commission of Maryland) I have required that in testing paving brick in the standard rattler the individual losses of each brick in the charge be obtained and recorded.

The results of these investigations, from many hundred tests, led me to adopt in our specifications for brick pavements the following paragraph (copied from the specifications of the State Roads Commission, 1908):

Brick.
"208. * * * and the losses in the rattler test shall not average more than — nor shall the difference between the maximum and the minimum losses in the rattler test exceed ten points."

All the brick pavements (aggregating several hundred thousand square yards) built by the State Roads Commission have been built under these specifications and speak for themselves.

I referred to this same point concerning uniformity of brick in my discussion of the paper (No. 1131) of P. E. Greene on "A Review of Chicago Paving Practice," printed in the Transactions of the American Society of Civil Engineers, Vol. LXVI, page 34. It is my opinion that the point is an extremely important one and well worthy of considerably more attention from the profession, as you

suggest in your editorial. It seems to me even that a considerably higher loss than usually specified can be allowed in the rattler provided departures from the average by the individual brick can be correspondingly reduced.

The revolving test proposed by Mr. McCabe is extremely interesting and will quite likely add to the knowledge of the subject of wear of pavements. I, however, have found the rattler test so convenient and satisfactory that I do not like to abandon it for the more complicated test of Mr. McCabe, and especially in view of the fact that I believe the uniformity of the brick can easily be determined as has been done by us with it.

The second article of interest above referred to was that on page 932—"Grouted Granite Pavements." I was interested in the suggestion that too hard a granite should not be used in order that slipperiness might be avoided. I think this is a very important point, and in my discussion on "Chicago Paving Practice" above referred to I said:

"Possibly a test similar to the customary rattler test of macadam materials could be made on material offered for stone block work, and, by specifying the maximum loss necessary to reject a block which would wear too rapidly to be economical, and a minimum loss lower than which a block might be expected to wear rounded and slippery too easily, one might avoid conditions, which, in some localities, might be undesirable."

I hope the developments in these matters may be aided by further discussions of them in your columns.

Very truly yours,

W. W. CROSBY.

DUST PREVENTION IN ST. PAUL

Sprinkling and Oiling Streets.—Organization.—Procedure.—Method of Operating.—Oil Tanks.—Cost.—Assessing Cost.

By G. H. HERROLD, Office Engineer, Dept. of Public Works.

The sprinkling and oiling of streets in St. Paul, Minn., is under the jurisdiction of the commissioner of public works. The sprinkling organization is under the direct charge of the office of engineer and consists of a chief inspector, 9 district inspectors, 90 teamsters, 2 wagon repair men, 4 standpipe repair men, a chief record clerk and 2 assessment clerks. The sprinkling area of the city is divided into 9 districts, with from 8 to 12 teams to each district under a district inspector (the boundaries of these districts do not conform to ward boundaries). The inspectors are paid \$75 a month for 8 months and the teamsters \$100 a month for the sprinkling season, which usually opens early in April and closes about Nov. 15. These teamsters work every day, including Sundays; in fact, excepting rainy days, they have but two days off during the season, Fourth of July and Labor Day. When wet weather makes sprinkling unnecessary, these teams are used by the superintendent of streets on various jobs.

The sprinkling and oiling of streets is ordered by the Common Council. The procedure is as follows: In March the commissioner of public works makes up a list of all streets that should be sprinkled or oiled and presents it to the Council. Some changes may be made in the list by the aldermen and it is then published and the commissioner of public works ordered to sprinkle the streets as published. Some changes are made in the list during the summer by order of the Council. The question of the number of times a day a street should be sprinkled and the streets to be oiled is left to the judgment of the commissioner, in both of which matters he is guided by public opinion to a certain extent, as expressed by petition or in the kickers' column of the daily press or over the telephone. In general, all macadam streets are oiled and paved business streets are water sprinkled 8 trips a day.

From the published list of streets to be sprinkled, team routes are made up for each team so as to give each a full day's work, based on the number of trips to

be made, grades, location of water hydrants, etc. To facilitate routing, the sprinkled area of the city is mapped on a scale of 600 feet to 1 inch on sheets of uniform size, 8½x13½ inches. These maps show blocks, names of streets, distance from center to center of streets and location of standpipes. Preliminary routings are made by using these blue prints. They are then checked on the ground by the inspector. The teamster follows the designated route and a record is kept of the time and distance required for emptying tank, time required to fill tank, idle travel after tank is emptied in getting to next hydrant, etc. Work travel is platted on the blue print in full black lines and idle travel or back tracking in dotted lines, and the route revised if necessary to reduce the idle travel to a minimum. Each driver distributes 40 to 48 tanks of water a day, or 30 to 36 thousand gallons, and travels 10 to 14 miles. Idle travel will average about 20 per cent of the total travel.

The water for sprinkling is taken from hydrants erected especially for sprinkling purposes, and is furnished free of charge by the municipal water works, as provided by the charter. There are 480 of these hydrants installed. They are made of 2-inch galvanized iron pipe with cast iron casings, and cost complete about \$58. They are a source of annoyance, as property owners object to them. They are located as far as possible at alley entrances on side streets. It would be more economical to take water direct from fire hydrants. The maintenance of the special hydrants is a large expense, \$3,800 in 1911. The water department has objected to the sprinkling department using the fire hydrants and have succeeded in "putting over" their objections up to the present time. On paved streets there is no excuse for special hydrants, as any waste water immediately runs away to the sewer.* There might be some objection to using fire hydrants on dirt streets where waste water from the hose connection might make a muddy place. There should be no waste water from sprinkling hydrants, as they are ten feet high and are shut off and drained while the tank is still under them; but drivers will allow their tanks to run over through carelessness.

The city owns 101 tank wagons of 600 to 750 gallons capacity, mostly the latter; 3 oil wagons of 600 gallons capacity, and two sanding wagons. Ninety water tanks are in continuous use, leaving 11 in reserve. The total miles of streets sprinkled and oiled in 1912 was 267. Thirteen and a half miles of macadam streets were oiled once only and 10.1 miles were oiled twice.

In oiling streets, the macadam, if good, is first swept clean and then oiled with a 40 per cent asphaltic oil, heated. The heating is done at the storage tanks in four 10,000-gallon tanks located on trackage, by means of coils in the tanks and a small steam plant. This oil plant is shown in the accompanying plan. A similar plant is now being built in the downtown district comprising 3 tanks located on the top of a bluff 85 feet above the railroad tracks, to which the oil will be pumped from the cars through a 3½-inch pipe by an electrically driven pump having a capacity of 50 gallons a minute. The oiling is immediately followed by the sanding wagons, which sprinkle a thin coating of clean sand over the freshly laid oil. One side of the street only is oiled at a time. This permits traffic to use the other half while the oil is fresh and until it soaks into the macadam and is taken up by the sand. One or two days' time is required for this, when the other side is oiled and sanded.

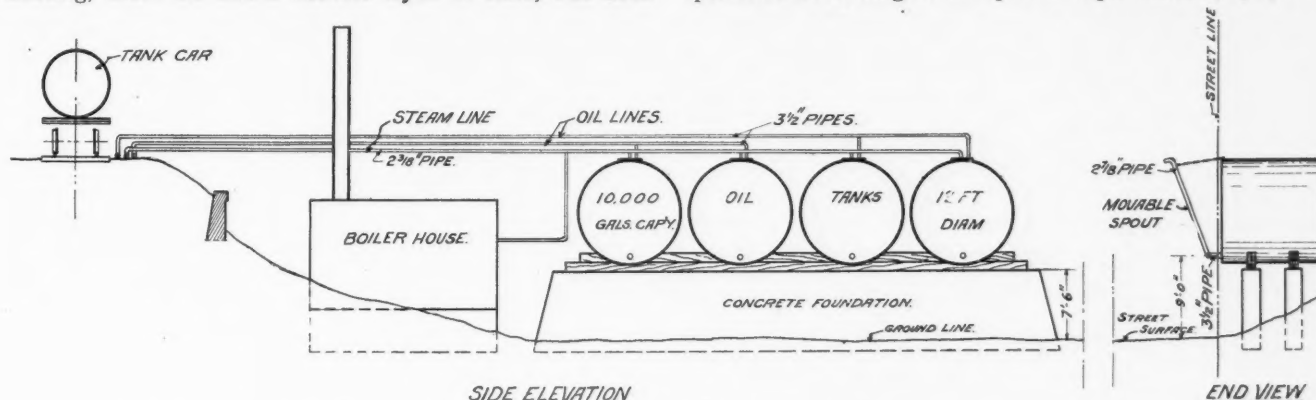
When the macadam is poor and getting worn out, no sweeping is done. The regular spring repair work is done first, holes filled and rolled, and the oil is then

*See editorial in this issue.

spread without sanding. Sanding is not necessary, as the oil is taken up by the fine material on the macadam. Such streets should not be opened to traffic for about three days. Different weights of oil have been used, namely: 20 per cent, 40 per cent and 60 per cent asphaltic oil. The 20 per cent oil is used without heating or sanding afterward. The 60 per cent oil requires more heating, more oil and a heavier layer of sand, but does

is figured to Nov. 15. Expenses such as equipment repair have mostly been taken care of earlier in the year (all heavy repair work is done in February and March), and bills for material and oil are in or known.

The cost of each form of sprinkling being known or estimated, the next step is to properly apportion the expense to the property benefited. As each street is sprinkled according to its special requirements, 2, 4, 6 or



TANKS FOR OIL SPRINKLING SYSTEM, LEXINGTON AVE. AND N. P. R. R. TRACKS, ST. PAUL, MINN.

not give as good results; at least, that is our experience. The 40 per cent oil seems to be the happy medium, for while the 20 per cent oil is easier to handle, it is too light for the traffic and wears out too quickly.

Less oiling was done in 1912 than would be done in a normal year. This year the cool weather and late rains delayed the first oiling until June. The lapse of time between oilings is determined wholly by conditions brought about by traffic and weather.

Calcium chloride is used on the downtown paved streets in fall and spring when sprinkling is necessary and water will freeze. From $\frac{3}{8}$ lb. to $\frac{7}{8}$ lb. is used per gallon of water, depending upon the temperature. The regular water sprinklers are used to distribute it. The water is heated by means of steam to dissolve the chemical.

The total expense of this service this year will be \$100,610.67, which will be assessed against the property owners, and against the street railway where they have tracks. The street railway company pays a proportion of the cost based on the ratio of the street car width to the total width of street sprinkled or oiled; the street car width being 2 feet outside of the outside rails, or a total of 19 feet on double tracks. Approximately 5,500 pieces of property are assessed.

The office work is carried on as follows: Each team route has a number and each street has a number. The inspectors make daily reports on blanks provided showing district, route and street numbers sprinkled and the number of trips. These are recorded on check forms in the office which have been prepared in advance for each route.

The route laid out for a team is definite and cannot be changed by the inspectors. The teamster and inspectors are given a route sheet showing streets and limits that must be covered each day and the number of trips per day, and the teamster must cover the route. The office check form shows the work laid out for each team and the daily report shows the work completed or reasons why it is not.

The assessment for oiling and sprinkling has to be in the hands of the county auditor on October 10, and as it requires about 5 weeks to spread the assessment over the 5,500 lots affected, using the regular office force, it is necessary to approximate the cost of the work for the year about Sept. 1. This is easily done, as the expense to Sept. 1 is known and the expense for the balance of the year will be principally a payroll charge and

8 trips a day, some streets requiring a trip down the center to cover while others require two trips, one on each side of the street; and as some streets are sprinkled the entire season while others are not; and as, on macadam streets, water sprinkling is superseded by oiling in May or June; and as paved streets are sprinkled with calcium chloride after freezing weather begins; the cost of the three methods of sprinkling must necessarily be assessed separately, and in the apportionment of the cost of water sprinkling a factor or coefficient must be introduced which may be called the "coefficient of benefit." This coefficient "C" is the product of the number of trips made per day over a certain section of street by the number of months and fractions of a month that section of street was sprinkled.

If a certain section of street was sprinkled four times a day from April 15 to November 15 the coefficient of benefit would be $4 \times 7 = 28$. If water sprinkling was superseded by oil sprinkling June 1, the coefficient would be $4 \times 1.5 = 6$, or if the property owner should request heavier sprinkling and the number of trips should be increased from 4 to 6 on, say June 23, then there would be two coefficients to be applied to the base rate $4 \times 2.25 = 9$ and $4 \times 4.75 = 19$, expressing the parts of months in decimals.

The base rate for water sprinkling is determined as follows:

X=total estimated cost.
R=base rate per foot.
R_f=assessment rate per frontage foot.
C=coefficient of benefit.
F=frontages for each value of C.
P=C X F.

Then

$$R = \frac{X}{P_1 + P_2 + P_3 + \dots + P_n}$$

and

$$R_f = C \times R,$$

The above method of determining the rate was put in use in this office in 1909 by C. L. Annan, formerly office engineer.

Thirty-eight rates were used this year in assessing the water sprinkling, the cost per frontage foot varying from \$.027 for 2 trips per day to \$.108 for 8 trips a day for sprinkling the entire season; or a 50-foot lot would be assessed \$1.35 to \$5.40 for the entire season.

The assessment for oiling is based on the total cost of oiling, total square feet of street covered with oil, the number of times oiled, and the frontage.

The daily reports of oiling show limits of oiling by streets. The office map records show the widths and lengths of streets. As the widths vary the rates also vary accordingly.

A=total cost of oiling divided by the total square feet of surface oiled=cost per square foot.

B=length of streets of same width multiplied by their common width=areas oiled.

C=A times B=cost of oiling for each set of streets having a common width.

D=C divided by the total frontage for each value of B =cost per frontage for each set of uniform-width streets.

The cost of oiling per square foot this year is \$.00152, or approximately 1.4 cents per square yard, for labor and material. An average of one-fifth of a gallon of 40 per cent oil was used for one oiling, and one cubic yard of screened dry sand covered 2,900 square yards of oiled street.

Calcium chloride sprinkling, which is resorted to on paved streets in freezing weather up to the snow fall, is assessed in the same way as oiling, on a square foot base. The cost of the chemical runs from \$2.00 to \$4.50 per tank of water, the amount used varying according to temperature. One sprinkling in moderately cold weather would cost \$1.32 per 1,000 square yards or 3 mills per frontage foot.

Prior to this year the total costs of the different sprinklings have been assessed as water sprinkling. This method saved considerable office work, but did not give a true and fair distribution of the cost. Calcium chloride sprinkling is a special benefit to the business district and oil sprinkling is confined to the macadamized streets. Where water sprinkling cost 2.7 cents per frontage foot, two oilings would cost about 4 cents or $1\frac{1}{2}$ times as much.

The method followed in spreading the assessment this year charges to each piece of property the actual cost of benefit derived from the three methods of sprinkling.

As a matter of expediency the water sprinkling organization does not handle the oiling or the calcium chloride sprinkling, which are more a function of the street department. The oiling is done under one of the street commissioners who is an expert in that work, and the calcium sprinkling is handled by the commissioner of the downtown district as he is more in touch with the conditions, has the confidence of the business men and can act promptly as necessity arises. But it all works in together without friction, in a very satisfactory way.

Under city ordinances the street railway company is required to sprinkle with water, oil or calcium chloride, the portion of all streets occupied by their tracks; but as a temporary compromise the city has been doing the work for the railway company, and the railway company accepts the city's bill for this without question. During this season, however, the railway company has equipped itself to do oiling and late in the season began oiling all their tracks. They are now equipped to sprinkle with calcium chloride also.

The following data may be of interest:

The oil distributors spray a width of 5 ft. 6 ins. or it takes five trips to cover a 28-foot driveway. The sand wagons spread 8 feet, or two trips of the sand wagon will cover 3 strips of oil.

It takes 250 to 610 pounds of calcium chloride to prepare a solution for one 750-gallon tank wagon; the colder the weather the more required to prevent freezing. One tank will cover 40,000 square feet of surface.

The water sprinkling wagons spray a width of 27 feet when full, gradually lessening to 18 feet at the finish with sprays wide open. It requires $4\frac{1}{2}$ minutes to fill a 750-gallon tank at downtown hydrants and a tank will emp-

ty itself in 12 minutes, traveling 1,700 feet and wetting an area of 40,000 square feet. The sprays can be adjusted automatically by the driver to decrease the amount of water, but practically covering the same width, and in this way a light sprinkling can be given, 750 gallons covering 60,000 square feet of street surface in 16 minutes.

ROAD TRAFFIC AND TREATMENT.*

Knowledge of Traffic Essential to Wise Selection of Pavement.—Traffic Census.—Life of Various Materials.

The constantly increasing number of vehicles that are using our roads and the constant variation in the character of the traffic, changing from horse-drawn vehicles to motor vehicles, makes necessary fundamental changes in methods of construction and maintenance. Naturally, the first and most important prerequisite of a good road is that it shall carry the traffic of all kinds that goes over it, comfortably, economically both for that traffic and for that road. Without knowledge of traffic the road-builder is really entirely at sea, he is likely to make serious and costly errors by determining upon the wrong kind of construction and by selecting improper or unsuitable materials or methods.

The Massachusetts Highway Commission in 1909 had a census taken upon the State highways at 238 stations, scattered throughout the State, and in 1912 a similar traffic count made of 156 stations. To illustrate the results, on the Revere parkway in August of this year, there was an average of 64 horse-drawn vehicles daily and 1808 automobiles, 97 per cent. of the travel was automobiles; whereas, in Somerville the average of horse-drawn vehicles was 440 and the number of automobiles only 164, or 27 per cent. of the total, and yet the traffic at both places would go into the total and help to make the average. Obviously, however, the two roads have such different traffic to carry that different material and methods must be used.

It has been found, too, that the total number of vehicles using the road has increased 42 per cent in three years. This is not the most significant feature for the roadman, however. The change in the traffic is what we must consider and prepare for. Motor vehicles have increased in numbers on the average 131 per cent, from 96 to 222 a day; on the other hand the teams have decreased on the average 14 per cent., from 151 to 129 a day, making the net increase only 42 per cent.

Equally interesting for the future may be the fact that while we had almost no motor trucks in 1909, in 1912 we have an average of over 11 per station per day, or about 3 per cent of the total traffic in numbers and much more in weight. The increase in motor trucks between our August and our October census was notable. The average number of vehicles at each station decreased 72 a day, or 18 per cent., while the number of motor trucks actually increased 4 per cent.

On the State highways near the cities we often found from fifty to seventy-five trucks a day, and usually from fifteen to thirty. On some roads motor trucks constituted over 16 per cent. of the total number of vehicles and actually outnumbered touring cars.

Naturally, automobiles have brought in traveling, and put many places upon the map which were not there before, especially in New York and New England, where the woods, lakes, mountains and seashore furnish the

*Paper by Col. William D. Sohler, Chairman Massachusetts Highway Commission, before American Road Builders' Association.

great recreation and vacation resorts for the whole country. In the town of Salisbury, on the main line to the large New Hampshire resorts, the new and better road has increased the travel. In 1909 we found an average of 185 vehicles a day passing over this road; in 1912, 585—an increase of 217 per cent in three years.

On Cape Cod in Massachusetts there is nothing but sand. The roads formerly were sand, and were deeply rutted, and travel was difficult. First, many of these roads were more or less hardened and greatly improved by using clay, or even loam, to help pack the sand. This worked reasonably well with very light traffic, but in a long dry spell the roads often went to pieces. Now the main lines on Cape Cod are mostly State highways, although often the town paid a large part or the whole of the cost of building them. Many of these roads are now macadam. The automobile traffic increased so much that they were rapidly being destroyed and we have had to oil most of them; again using motor vehicle fees.

Here again the increase in traffic shows how a good road attracts travellers. A sand oil road replaced a sand road, and here is the result:

In one town in 1909 there were 118 vehicles, of which only 41 were automobiles; in 1912 (only three years later) there were 331 vehicles and 142 of them were automobiles. The total traffic had increased 18 per cent but—mark this—over 100 more automobiles passed there every day. The tourist had arrived and was spending his money.

After all, however, it is not numbers which tells the story, it is weight, and it is not weight alone, but the vehicle by which it is transported, whether by horses or by motor. It is not the tractive power alone that makes the difference, but the tires which support the vehicle; whether iron or rubber comes in contact with the road; whether the vehicle is pulled over the road or propels itself, and thus pulls upon the road surface.

The weight of the automobile traffic has increased 160 per cent. in three years, while the weight of horse-drawn vehicles has actually decreased 8 per cent. in the same time. While this is true, note what happened—the motor truck has come in with an average number of trucks of $11\frac{1}{2}$ per station, and their weight is nearly seventy-two tons a day. Weight of teams decreased twelve tons a day, trucks came in with a weight of seventy-two tons a day—making good the loss in team weight six times over.

The experience in Massachusetts and elsewhere has shown conclusively that large numbers of swiftly moving automobiles cannot successfully be carried over a water-bound macadam road or over a gravel road. Such a road becomes ravelled very rapidly, rutted and disintegrated. Our traffic studies indicate that from fifty to one hundred automobiles a day make the use of some dust layer or binder necessary.

With the motor traffic which we already have, we are forced, we think, both for economy and for efficiency, where a road has heavy team traffic as well, to adopt in construction or resurfacing some form of bituminous mixture for the upper two or three inches of the road-surface, at least, or some stronger road-like concrete.

We have saved many miles of our old roads by spreading a coat of asphaltic oil—light or heavy—or tar, over them. Today some asphaltic binder or dust layer has been used on over 80 per cent of our State highways, and the only roads on which it has not been used are those located in the country districts where there is very light traffic. This year we have used nearly 2,000,000 gallons of bituminous material in construction or maintenance. Over 800 of the 930 miles of our State highways have received some form of bituminous treatment.

We have a good many miles of old macadam road

which have been saved and maintained by one-half gallon of hot asphaltic oil spread upon each square yard of surface and properly covered with sand and pea stone or gravel. These roads have, many of them, worn three years, and in their fourth year are still in good condition. The traffic study shows that it is not the number of teams, but heavy teams—two or more horses, heavy loads on narrow tires—that cause the failure.

The failure of roads treated with heavy oil has occurred on a few miles of road at certain places where it was clear that heavy horse-drawn teams were responsible. One Gloucester road covered with a hot oil blanket, was rutting and wearing out quickly in 1909. A coal team was passing to some hotels three or four times a day during the summer (carrying six or seven tons of coal on narrow tires). A motor truck was substituted for the coal team, and the surface of the road, which had been oiled, was again in good condition. It has worn three years and now only needs patching.

A hot oil blanket surface, made of a good asphaltic oil, will be economical and will carry large numbers of automobiles at high speeds (over 1000 a day in summer) for several years, will carry large numbers of light teams (500 a day), and quite a number of motor trucks (50 or so a day) but will be destroyed by a large number of heavy teams, especially with narrow tires.

When these surface treatments fail, as they will where the traffic is extremely heavy—meaning heavy in weight of vehicles, not numbers of vehicles—then you must select some more permanent form of construction and reconstruct your road as soon as possible. It will prove to be true economy in the end, and the end is not far off.

With much hesitation I have prepared a tabulation showing as nearly as I can the results we have observed after four years of experience with bituminous materials, comparing these results with the traffic going over the road in 1909 and again in 1912. The estimates are made on a standard road, fifteen feet in width, with a 3-foot gravel shoulder on each side.

A good gravel road will wear reasonably well and be economical with an average of from 50 to 75 light teams; 25 to 30 heavy teams, one horse; 10 to 12 heavy teams, 2 or more horses, and 100 to 150 automobiles, but needs to be oiled with more than 150 automobiles.

Oiled gravel is fairly good, either hot or heavy cold oil $\frac{1}{2}$ gallon coating (cold oil must be used yearly), when used by 75 to 100 light teams; 30 to 50 heavy teams, one horse; 20 heavy teams, 2 or more horses, and from 500 to 700 automobiles.

Water-bound macadam will stand with from 100 to 150 light teams; 175 to 200 heavy teams, one horse; 60 to 80 heavy teams, 2 or more horses, but not over 75 automobiles at high speed.

Dust layer will prove serviceable on such macadam with from 50 to 100 automobiles.

Macadam will then stand (but the stone wears, of course), with from 300 to 500 automobiles.

Water-bound macadam with hot oil blanket coat will be economical with 250 to 300 light teams; 75 to 100 heavy teams, one horse; 25 to 30 heavy teams, 2 or more horses; and 1400 automobiles.

The same will stand at least 50 motor trucks, and probably more.

But will crumble and perhaps fail with over 100 heavy teams, one horse, and 50 heavy teams, 2 horses or more, on narrow tires (loaded farm wagons, ice and wood teams, etc.).

Water-bound macadam with a good surface coating of tar will stand with 30 to 50 light teams; 25 to 30 heavy teams, one horse; 10 to 15 heavy teams, 2 horses or more; and 1800 automobiles.

MILWAUKEE FIRE AND POLICE ALARM

Telephone and Alarm Telegraph Systems and Power Plant.—Registers.—Switchboards.—Cables
—Fire Alarm Boxes.—Employees.

By W. S. BURNETT, Secretary Fire and Police Alarm System.

The following is a description of the fire and police alarm system of Milwaukee, Wis., and its activities; the equipment of the department, both office and street, and the employees and their duties.

CENTRAL EQUIPMENT.

The fire alarm central office consists of three different units—a telephone system, alarm telegraph system and power plant. The telephone system consists of a 600-line Cook cross-connecting rack, which is equipped with the necessary protection consisting of carbons and heat coils for the telephone circuits. The telephone switchboard is a Western Electric common battery 3-position multiple type with a capacity for 260 local lines and 10 trunk lines. All engine houses, offices and residences of officers connected with the fire department are connected to this switchboard by direct lines which are equipped with Western Electric telephones. All local line circuits are wired through special plunger type keys, which are located at the first position. By pulling out a plunger it disconnects the lines in use from the other two positions, so that in case of a telephone fire alarm the operator at the first position can disconnect all conversation, and use the circuit to transmit the alarm which, of course is considered more important.

The fire alarm apparatus is of the Gamewell type, and includes such features as the automatic circuit testing machine and alarm repeater. At present there are thirty box circuits, ten alarm circuits and eight joker circuits. The apparatus for the thirty box circuits, which includes telegraph relays, keys, switches, lamp and number check, is mounted on a slate panel. The telegraph relays are protected by a dust-proof case having a glass front, which reduces trouble caused by dust or dirt to a minimum. The registers are of the ink 4-circuit type mounted on a mahogany stand, together with their respective take-up reels. An extra register is also provided in case any of the regular instruments should become defective, and any one of the thirty circuits can be switched, in case of trouble, to this register.

Tests of the registers and relays are made by each shift of operators when reporting for duty, which occurs every eight hours. The transmission of fire alarms to the engine houses is done manually by means of a key to which all register circuits are connected. There is also an ink register with a time stamp which records the year, month, date and time, connected to this key. This is a very desirable feature, as it is a check on the operating department. This record can be filed for future reference. After the number has been transmitted to all the registers in the engine houses, it is again repeated on the gongs, the transmission of the alarm being controlled by an automatic alarm repeating machine.

The automatic alarm repeating machine is a very simple arrangement. The number to be sent out is set up by means of four movable discs of a dial pattern and its operation is controlled by a releasing lever. This machine will repeat the number three times. Should any of the registers at the engine houses fail to work, the number can be taken by counting the blows on the gong, but this method, of course, is only

used in case of emergency. There is also installed a manual key for operating the gongs, which key is used only in case the automatic repeater fails, or in case of two or three alarms coming in rapidly.

A very convenient method of keeping track of the apparatus which responds to an alarm is also employed by means of small electric lights which are located in the switchboard. These lights are shaded by different colored opals or lamp caps, which indicate chief, assistant chief, engines, trucks, or chemicals—one lamp for each individual or company. Whenever any officer or company leaves quarters for any reason, the corresponding lamp is immediately lit and left in this condition until reported back to quarters, when the lamp is restored. This operation is attended to by one of the operators in charge of the telephone switchboard.

POWER PLANT STORAGE BATTERIES.

The box and joker circuits are supplied with current by 1700 5-ampere-hour storage batteries. The batteries are operated as two individual sets, and are classed as the "A" and "B" batteries. The "A" and "B" batteries are sub-divided into sets varying from 16 to 76 volts to a set, depending upon the resistance of the circuits which are supplied with a current of one tenth ampere. Since all the lines are of the closed circuit type, it is necessary to charge these cells every 24 hours at a rate varying between 150 and 200 milliamperes. While the "A" set is on the discharge the "B" set is being charged and alternating in rotation. The charging source for these cells or batteries is taken from the City Hall 110-volt lighting circuit, arrangement having been made on the charging board for varying the resistance from 110 milliamperes to five amperes. The telephone switchboard is supplied with current from eleven type E cells of the Electric Storage Battery Co. make. These cells have a capacity of 30 ampere-hours, and are charged about twice a week. There is also another type E cell—a 25-ampere-hour capacity—which furnishes an E. M. F. of 66 volts, which current is used to operate registers, gongs, and automatic door



FIG. 1. FIRE REGISTERS.

openers at some of the engine houses. Owing to there not being a sufficient number of cable conductors, all the engine houses are not supplied with storage battery current, dry batteries being used in such places. However, these places will soon be replaced by the more modern method.

GENERATING PLANT.

For charging the type E cells there are two Western Electric motor generator sets, each having a capacity of 30 volts and 30 amperes, or 900 watts. For charging the telephone batteries one machine only is required;

but for the 25-hour cells, whose voltage is far above the output of one machine, it is necessary to connect the two machines in series, this being provided for by a proper arrangement of switches located on the power board. The current to operate the motors is supplied by the City Hall power plant. There are two small motor generators which supply the alternating-ring current for telephone use, one of which machines is run from the 110-volt lighting circuit, while the other, which is classed as a service machine, is run from the telephone batteries. A reserve lighting and power system from the local electric company is installed also. Should the City Hall power plant fail, it would be necessary only to throw over a master switch and the City Hall plant would be disconnected and the Milwaukee Electric Light and Power Company's service connected.

OUTSIDE PLANTS.

Approximately 80 per cent. of the mileage of the circuits is fed by underground cables, the balance being aerial construction. However, the circuits are being placed underground as rapidly as conditions will permit, as it is a much safer method, especially when electric storms prevail. It is at this time when the circuits should be in working order, but owing to heavy lightning discharges it is almost impossible to keep them so with the circuits overhead.

Two different types of alarm boxes are used, one known as the weight, or interfering type, and the other operated by a spring and known as a non-interfering type. The non-interfering type alarm box has a distinct advantage over the interfering type when more than one fire alarm is operated on the same circuit simultaneously. The operation of the non-interfering type is such that two alarms can come in simultaneously and register without confusion. This operation is controlled by an electro-magnet feature. The first alarm opens the line holding the other alarm in check until the signal is completed, then locks itself and permits the other alarm to follow in. This is a great improvement over the old style, as it permits carrying a large number of fire alarm boxes on one circuit. After this type of alarm box has been operated two or more times it is deemed necessary to wind up the spring. This requires keeping record of the alarm boxes pulled, and also requires a man to attend to winding them up. This is not true of the weight box, as the weight is restored by the individual operating the movement.

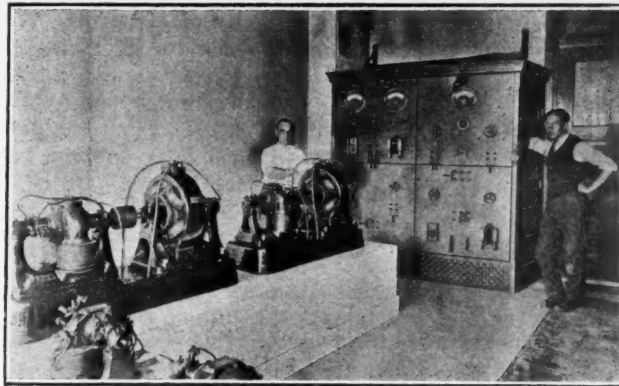


FIG. 3. GENERATING PLANT.

These boxes are enclosed in a cast-iron case, which is provided with a key-guard type of door or a keyless door. The keyless door is provided with a 6-inch gong which rings upon opening the door, thereby preventing anyone tampering with the fire alarm box without attracting attention. The key-guard type of door, used in this city, is opened by means of a key which is usually left inserted in the lock and protected by a small glass plate. To send in an alarm it is first necessary to break the glass and open the door with the key. Since this is a noiseless operation this type of door is placed on the fire alarm boxes located in such places as theaters, hospitals, and places where a large number of people may congregate. This type of box is not apt to create a panic through sending in an alarm.

There are at present 720 fire alarm boxes in use, of which the following is a table:

Street boxes	552
Private boxes	168
Interfering boxes (58 private).....	402
Non-interfering succession boxes (110 private).....	318
Boxes with keyless doors.....	562
Boxes with keys attached.....	158
Plain boxes	708
Boxes with auxiliary attachment (7 private).....	12
Boxes mounted on special iron pedestals.....	180

FIRE AND POLICE POSTS.

The National Board of Fire Underwriters, in their report on the fire alarm telegraph of Milwaukee in 1906, recommended the placing of a red light on the fire alarm boxes located in congested districts, their contention being that a loss of time might occur in



FIG. 2. POWER PLANT, STORAGE BATTERIES.

finding the fire alarm box. The city of Milwaukee constructs its own posts, and in order to meet the demands of the Board of Underwriters secured a type which would permit of placing a light on the post. With this there was also provided a separate compartment which would also furnish the fire department with a telephone service. This class of service not being secret, it permitted of the aldermen and city employees using this service, so another compartment was provided for a secret police telephone and signal system.

The lower part of the post contains space for a cable testing block and a flashing set. The object of the testing block is to locate possible cable trouble; and a flashing set of a selective nature provides a citizen's police call service by flashing the light on the post, the normal burning of the light indicating the fire alarm box. This post is designed to cover all possible future requirements. There are 50 of these posts on hand, of which five have already been installed.

ENGINE HOUSE EQUIPMENT.

Engine houses are equipped with either a punch or ink register to record the alarms; also a gong for the same purpose in case the register fails to operate. An electro-magnet, connected in series with the gong circuit through a double-pole switch, is used to release a stall door controlling weight. By means of this double-throw switch it is possible to release the stall doors by hand, which is necessary in case of a telephone alarm, when the register or gong is not operated. This same switch is used to short-circuit the electro-magnet and prevent the stall doors from operating. Since all the alarms are transmitted to every engine house and each engine company has a certain district to cover, it is only in those districts which the engine company is required to cover that the stall doors are allowed to be operated. There is what is termed a "running card" system which indicates to the engine companies what fire apparatus has to respond to alarms in the various sections of the city, and the first number of the alarm tells the engine companies the section of the city where the fire is, and whether they are to respond.

PIPE LINES.

Pipe lines are distributed throughout the manufacturing and congested districts of the city and terminate at the river. Since the distance between the different hydrants and the river varies from a block to a mile,

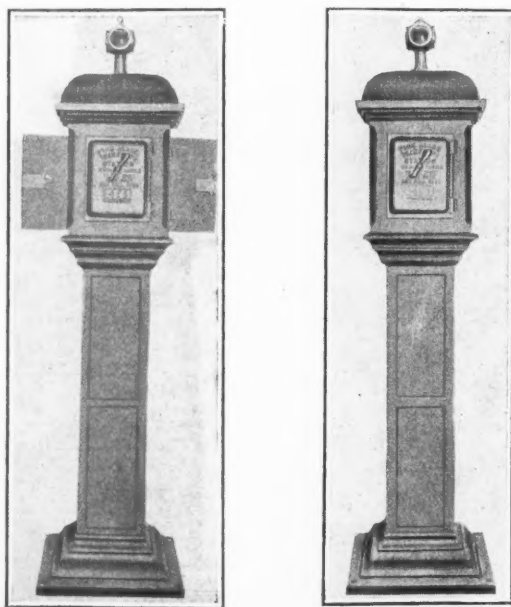


FIG. 4. FIRE AND POLICE TELEPHONE BOX, OPEN AND CLOSED.

a means had to be adopted for controlling the water used at a fire, which water is supplied by pumps on the fire boats, connected with the pipe line. A signal box containing a push button is placed on each of the hydrants connected to this pipe line, and an underground system of telegraph lines composed of twin lead-covered lines enclosed in conduits is laid to points where the fire boats have connection with the pipe line. In order to furnish the fire boats with an electrical connection, the boats are fitted up with a bell and batteries and a reel of insulated pair of copper wires having a plug which can be attached to the pipe line signal box at the river. A code of signals is used for directing a high or low pressure of water.

POLICE ALARM EQUIPMENT.

The electrical plants in the police department are somewhat similar to that of the fire department. The following is a brief analysis of that branch of the service.



FIG. 5. POLICE ALARM EQUIPMENT.

The telephone plant consists of a 300-line capacity Western Electric cross board equipped with heat coils and carbon protection. The switchboard is a Western Electric 3-position common battery multiple type, with a capacity of 100 local lines and 10 trunk lines. The police dispatching circuits terminate on a jack and key, the key being used for answering the patrol men when they are reporting, of which reports over 950,000 are made per annum. The registers used for patrol wagon calls are of the Gamewell slotted type of which there are 29 in service, one for each circuit. The registers are operated by an 80-volt battery pressure over one side of the telephone circuit and the ground. The telephone circuit, before it enters the switchboard, is made through a 4-spring contact in the register. These contacts, when broken, disconnect the switchboard battery when the register is set in operation.

The power plant which supplies the operations with power is made up of thirteen 30-ampere-hour batteries for the cord circuits in the switchboard; sixteen 30-ampere-hour batteries furnish the current for the dispatching lines; two sets of 40 batteries, each of 5-ampere-hour cells furnish the current for the operation of the registers.

The 30-ampere-hour batteries are charged by a motor-generator having 30-volt and 30-ampere capacity, while the 5-ampere-hour cells are charged with current obtained from the City Hall plant. Two motor-generators, one 110-volt and one 26-volt, furnish the ringing current for the telephone switchboard.

The outside plant is made up of the necessary underground and aerial construction, having a total mileage of 671 miles 4,814 feet. The patrol boxes or reporting stations contain apparatus consisting of a transmitter and receiver (telephone) connected in series, and a clock wheel movement constructed to make and break telegraphic impulses which signify the number of the

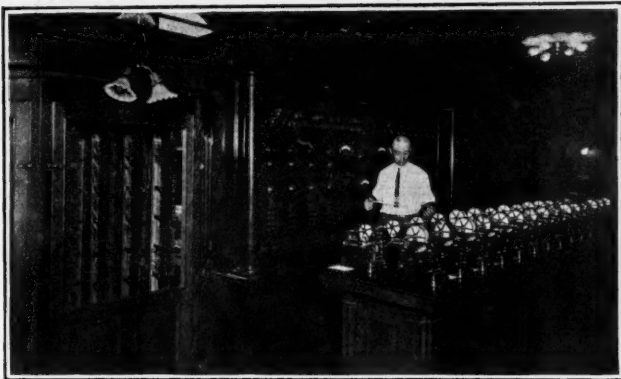


FIG. 6. POLICE REGISTERS.

station calling. This movement is generally termed a wagon call. As previously explained in connection with the registers at the central station, the wagon call is operated by an 80-volt battery pressure over one side of the telephone circuit and the ground, the break wheel making the make and break between the line and the ground. There are two kinds of housings for the patrol box apparatus, one of which is the post containing a compartment for the apparatus, and the other a small round booth. There are 234 of these booths located in various parts of the city, and 61 posts, 5 of which are combination.

Five police stations are each fitted up with a gong and automatic door opener, the dispatching of patrol wagons being accomplished through the use of the telephone. The source of energy for operating the electrical apparatus is furnished by storage batteries located at the central office.

EMPLOYEES OF THE DEPARTMENT.

The superintendent of the Fire and Police Alarm System has had thirty years' experience in both fire alarm telegraph and police alarm telegraph work. The foundation of the police alarm service of this city was laid by the superintendent, O. D. Kleinsteuber. While the first twenty-one years of his work was devoted to the police alarm service, during the past nine years he has given his attention to the fire alarm service, having built it up to its present standard.

In order to place the combined fire alarm and police alarm telegraph department on a safe and sound footing, it was found necessary to accomplish three things, viz: first, create it; second, take it out of political control; third, build it up to the highest standard of efficiency and economy.

In order to accomplish the efficiency, it was found necessary to surround himself with men competent to handle the various assignments. For an assistant Mr. Kleinsteuber selected his brother who had had ten years' experience in the police alarm telegraph as an assistant superintendent, and prior to that time had had thirteen years' experience as wire chief of the Wisconsin Telephone Co., having had as many as thirty-eight men under him at one time and having charge of the Milwaukee territory. As chief lineman he chose Carl Dietsch, who had had charge of the linemen in the police alarm service, and prior to that time had had charge of construction crews in the employ of the Wisconsin Telephone Co. The chief electrical repairer who had occupied the position under the fire department resigned and it was necessary to secure a first-class man for the position. Chas. Stein, who was employed by the Wisconsin Telephone Co. as wire chief, received the appointment, as he was very highly recommended and stood the highest in the examination. It might be well to state right here that all examinations for positions in this department are conducted by the Fire and Po-

lice Commission and a list of eligibles for each class of work is furnished the superintendent to select from; the examinations being conducted the same as any Civil Service Commission conducts them. Several new linemen were appointed, the positions formerly having been filled by men assigned from the fire or police departments which would naturally supply men not as familiar with electrical work as those who had already passed through all branches and phases of the business.

The functions of the department of Fire and Police Alarm System are the extension and maintenance of the system, and the furnishing of power for its operation. The cost of the operations is an expense of the fire department and the police department respectively. The deputy city comptroller has deemed it advisable to have a classification of accounts to be designed to give accounting information relative to the cost of the construction and extension of the system; the cost of maintenance and the cost of power for its operation.

The accounting detail has been divided with a view of making comparisons of each element of cost entering into each operation in order that abnormal conditions can immediately be rectified, thus enabling the superintendent to conduct the department on the most economical and efficient basis.

The chief lineman's duty is to look after the extensions, and the chief electrical repairer looks after the maintenance—the responsible part of the service, since some of the apparatus is very delicate and as it is exposed to the weather it will deteriorate under the most favorable conditions. This work is performed by a well organized department called the trouble department, and is in charge of the chief electrical repairer who has under him four capable linemen, who are electricians two of whom work nights and the other two working day time. When there is no actual repair work to be done, these men are kept busy inspecting and pulling alarm boxes, or inspecting other apparatus. Any defective apparatus which can not be repaired in the field is replaced by a new piece and the old brought in for repairs, which are performed in a small repair shop which belongs to the city and is equipped with all modern tools and machines adapted to this class of work. The department generally carries on hand \$12,000 worth of alarm boxes, engine house electrical equipment, telephone equipment, and general supplies for same. There are over 1777 miles of fire and police telephone and telegraph lines (in cables and overhead) that have to be looked after and kept in good condition regardless of weather and time of day, requiring close attention on the part of the maintenance department.

During the year 1912 records have been kept from April 1 to the present time, and the expense for maintenance, exclusive of shop work, was as follows:

Fire Alarm Telegraph.		Police Alarm Telegraph.	
April	\$367.57	April	\$66.93
May	318.80	May	84.37
June	187.38	June	23.87
July	219.35	July	63.18
August	193.23	August	37.16
September	89.26	September	41.51
October	98.45	October	36.90
November	111.85	November	53.82
	<u>\$1,585.69</u>		<u>\$407.74</u>

During the year 1912, \$5,260 was allowed for the office allowed for salaries and wages for maintenance and extensions; \$41,888 for outlays—property investments; \$5,875 for telephone service in the City Hall and city extension of telephone service. The city of Milwaukee has always been very liberal in making appropriations for obtaining an efficient service, believing that modern apparatus of durable and lasting qualities will, in the long run, produce the desired economy.

NEWS OF THE MUNICIPALITIES

Current Subjects of General Interest Under Consideration by City Councils and Department Heads—Streets, Water Works, Lighting and Sanitary Matters—Fire and Police Items—Government and Finance.

ROADS AND PAVEMENTS

County Boulevard Now Open.

Avalon, N. J.—The County boulevard, extending from the State highway at Swainton to Avalon at Twenty-first street, a distance of four miles, has been completed and officially opened to public travel. The new road cost \$100,000 to build, and provides Seven-Mile Beach with a long-hoped-for connection with the mainland.

Ready for Road Surveying.

Fort Worth, Tex.—Two corps of surveyors under direction of Engineer Travilla will begin making the preliminary surveys for Tarrant County's \$1,000,000 road system and it is expected that dirt will be broken in a short time. The figures compiled by the surveyors in the field will be sent to Engineer Travilla's office at St. Louis and the work of preparing the estimates will be done there. Preliminary work on the new bridges under the \$600,000 bond issue is progressing rapidly. The Main street bridge has been abandoned by the traction company and will be closed to traffic. Excavations for the foundation of the West Seventh street bridge are now being made.

Steady Progress Made on Highway.

St. Augustine, Fla.—The Board of County Commissioners, under the personal direction of Chairman B. Genovar, is making steady progress in the work of surfacing the bad spots of the John Anderson boulevard with Augusta gravel. The first installment of fifteen cars of the gravel has almost all been received and spread over the road. Work at present is being done on the highway near Woodland, which is one of the bad sections of the road. The gravel is being placed along the road to a width of twelve feet and a depth of six to eight inches. That section which has already had the greatest wear is holding up beautifully and becoming better under heavy travel.

Street Paving Is Inspected.

Richmond, Va.—R. Harrison Johnson, president, and N. H. Shea, secretary and treasurer of the Washington Asphalt Block and Tile Company, in company with City Engineer Charles E. Belling, recently inspected the work of paving Broad street. The city's contract for paving is with the Washington concern, which makes the blocks, that company having sublet the actual laying of the paving to Contractor John J. Curley, who is giving the work his personal supervision. The visitors and City Engineer Belling expressed themselves as well pleased with the character of the paving. An unusually large gang of men laying the blocks in the southern side of the square, between Fourth and Fifth streets, laid more than 1,000 square yards of blocks in a day, believed to be the largest laid in one day since the work commenced. The concrete foundation has been laid along the southern side of the street to Third, and the paving will be soon completed over that section.

Road Work in Bennington County.

Bennington, Vt.—During the past construction season there has been considerable road work done in Bennington County. There have been constructed 23 sections in 14 different towns. This work has been done for the most part under the advice of and supervision of a representative of the United States office of Public Roads. Several types of surfacing have been used. There have been 15 gravel roads built, 3 roads surfaced with hard pan, 1 with crushed stone, 2 with clay and gravel mixed, and 2 roads were simply drained and surfaced with the natural soil. The distribution of this road improvement among the towns is as follows: Pownal, 4 sections; Sandgate, 3 sections; Manchester, 2 sections; Woodford, 2; Sunderland, 2; Rupert, 2; and 1 each

in Winhall, Shaftsbury, Stamford, Searsburg, Arlington, Bennington, Glastenbury and Landgrove. There has been built in addition an arch stone bridge of 25 foot span in the town of Manchester. The total length of road graded amounted to 26,972 feet, total surfacing 26,272 feet, and the total cost of the work done was \$20,399.66 reported to date.

State's Best Highway Finished.

Sag Harbor, L. I., N. Y.—The Dunbar Construction Company of New York completed the State road between Sag Harbor and Easthampton and has discharged its laborers and is removing its machinery. For three years this road, pronounced by the builders and State inspectors to be the best strip of public road in New York, has given employment to a big force of men. The line of survey is the same as the old Easthampton turnpike road, ceded to the town of Easthampton by the stockholders of the toll road. It is constructed of stone with an asphaltum binder.

Road Open for Traffic.

Indianapolis, Ind.—The improvement of the Crawfordsville road from Indiana avenue to the Emrichsville bridge over White River, has been completed and the road is now open for traffic. The improvement was made to affect a passable highway for the trucks of the Prest-O-Lite Company which is building a new plant near the Indianapolis motor speedway, and for other manufacturers. Crushed stone to the depth of fourteen inches was applied to the roadway and then, with an asphalt binder, was rolled down to a depth of twelve inches. The improvement is twenty feet wide and was made under the direction of Joseph L. Hogue, city street commissioner. The city council made a special appropriation of \$10,000 for the work and the cost above this is to be paid by the Board of Park Commissioners. When a paved roadway is built in Sixteenth street from Indiana avenue to the Emrichsville bridge next year, the park board will take the newly improved section of the Crawfordsville road as a boulevard.

Boulevard for New Year's Present.

Pittsburgh, Pa.—Director Joseph G. Armstrong, of the Department of Public Works, has promised the people of the city a New Year's present in the shape of another half-mile of boulevard. This is the section of Grant Boulevard running from Seventh avenue to Smithfield street, through the "Hump" district. It is believed that this strip will be finished by New Year's and that it can be turned over to the people at that time. The new section is paved with wood block and is the same width as the original boulevard, which connects the downtown part of the city with the East End. The old boulevard, however, is asphalt paved. The new part is finished from Seventh avenue, where the old boulevard ends, to Tunnel street and Webster avenue. The remainder of the work, it is said, will be finished on time.

City Leases Chert Bed.

Chattanooga, Tenn.—A considerable saving is to be effected in chert through a deal consummated recently by the Department of Streets and Sewers. For a term of years the city has secured a lease on a fine bed of chert near Ooltewah, only a few miles from Chattanooga. This deposit will be worked either by contract or with city forces, according to which is the best economy. During past months, when the department was endeavoring to push chert resurfacing and repair with a view to getting all streets of that character in good condition before bad weather set in, great difficulty was encountered getting chert delivered. Next season, from the present outlook, this trouble should not exist.

Work Commences on Islip Highways.

Islip, L. I., N. Y.—George Cahill, the superintendent of highways of the town of Islip, is rejoicing because surveyors have started work upon the road leading from East Islip to Smithtown and there is good reason to believe that among the first roads to be built from the \$50,000,000 appropriation for good roads will be this ten and one-half mile stretch. The road will probably be macadam, like the State roads now under construction in this section, and the improvement will be especially welcomed by automobilists. Work on the State road between Clinton avenue, Bay Shore, and the Brookhaven town line has already started. The contractors are building culverts to replace those already in place, some of which have needed considerable repairs. Others are being replaced now, in order that the road will not have to be torn up after it is laid to make the repairs. Superintendent Cahill is also building a service road, running north of the South Country road, in order to enable traffic to pass through the town while the construction of the State road is going forward.

City Officials Pleased With Paving.

San Antonio, Tex.—The first block of new paving on East commerce street has practically been completed, and after an inspection of the work as far as it has progressed both Mayor Jones and City Engineer Pancoast expressed themselves as well pleased with its character and construction.

The laying of the creosote wood blocks was begun under the personal supervision of R. W. Colglazier, vice-president and general manager of the Roach-Manigan Paving Company of Memphis, Fort Worth and Dallas, which has the contract from the city for paving East Commerce street. The work is being pushed as rapidly as possible, but it will be two or three weeks before the street is again opened to traffic. "We are delighted with the work as far as it has progressed," said City Engineer Pancoast. "Mayor Jones and I inspected the street and took careful note of the manner in which the blocks are being put down. There is no doubt but that the creosote black paving is the best of all modern street paving, and San Antonio will have a splendid street when East Commerce is completed."

SEWERAGE AND SANITATION

City to Administer Serum for Typhoid.

New York, N. Y.—After Jan. 1, the Department of Health of New York city will inoculate all persons who may apply with anti-typhoid serum in order to prevent infection with typhoid fever. Commissioner Lederle says in Bulletin 142, dated Dec. 18, that immunization against typhoid fever, or the inoculation of a healthy person with sterilized typhoid cultures, has passed beyond the experimental stage and has become established as a prophylactic measure of proved efficiency.

To Prevent Sewer Clogging.

Jersey City, N. J.—Chief Engineer Charles Van Keuren of the Street and Water Board has had six of his engineers working for a month on plans for relief sewers to prevent a recurrence of the condition which occurred in October when the city was flooded after a heavy rain storm because of the clogged sewers. The plans when ready will be submitted to the Street and Water Commissioners for their approval. The Commissioners will make demand upon the Board of Finance for money to construct the sewers. It will, it is estimated, cost fully \$500,000 to put the city's sewers in proper working order.

Sewer Controversy Is Ended at Ocean Grove.

Ocean Grove, N. J.—Ocean Grove and Neptune Township have signed an agreement whereby the township secures right of way through Ocean Grove streets for its sewer outlet. The agreement is practically the same as the one residents of West Grove refused to ratify two weeks ago. According to its terms Neptune pays \$2,500 for a right of way, turns over \$19,500 to Ocean Grove on the out-

let and septic tank contract and extends the outlet pipe 1,200 feet out to sea, instead of 700 feet, as originally planned, at a cost of \$3,000. Ocean Grove completes the outlet plant and without further compensation maintains the system until the population of the sewer district number 40,000. The sewer commissioners signed this agreement and work will proceed at once. The signing of the agreement ends threatened litigation to establish Neptune's supervision of Ocean Grove streets.

Plague Scare Depopulates Midville, Ga.

Midville, Ga.—With thirteen dead and a number of other cases now being treated for cerebro-spinal meningitis, the people of Midville are flying, panic-stricken, to other sections of Georgia. Already over 200 residents have gone, and every train that leaves the city is filled with terror-stricken passengers, who are leaving homes and deserting business, in the wild desire to save their own lives. The meningitis scare started with a number of cases among negro laborers near the town. The disease soon spread to the whites. It has been under way for some time and is now beyond the control of the local authorities, it is stated. Practically all the stores were closed, and it is charged that even physicians deserted their posts and started for other cities. Dr. Willis Kershaw, who has taken charge of the situation, has appealed to the State Board of Health, and an appeal has also been made to Gov. Brown to ask the federal authorities to take charge. Waynesboro, the county seat, has quarantined against the Midville section.

WATER SUPPLY

Fresh Water Underlies San Francisco Bay.

San Francisco, Cal.—San Francisco bay appears to be underlaid with a basin of fresh water. A pile 110 feet long, driven in the bay bottom at the foot of Mission street, tapped a pressure vein that is still gushing. The first spurt rose four feet above the salt water. The jet was about 10 inches in diameter and continued undiminished at last reports. A chemical analysis was ordered and geological experts will be called in and divers sent down to examine the source of the flow.

City Builds Boom to Prevent Water Famine.

St. Louis, Mo.—Water Commissioner Edward E. Wall announces that a boom, designed to keep ice from entering the intake pipes will be placed in position at the Chain of Rocks intake tower. It is expected to prevent a clogging of the pipes such as threatened a water famine in St. Louis last winter. The boom is made of heavy timbers attached to steel air tanks, which are used as pontoons. It is 60 feet in length, 12 feet wide and 9 feet deep.

Portland Water To Be Tested Daily.

Portland, Me.—The Portland Water District is equipping a laboratory at its building on Kennebec street for the purpose of making its own tests of the water. It is the plan of the trustees to have daily analyses of the water made in this laboratory, also bacteriological tests from time to time, so that the quality of the water supplied to takers in the district may be known absolutely at all times.

Reservoir Ready by First of the Year.

Muskogee, Okla.—The work on the Agency Hill reservoir should be completed and the reservoir ready to have water pumped into it by the first of the year, if the weather permits the laying of the concrete on the floor of the structure, Joseph McCusker, commissioner of water, lights and sewers, has announced. The new waterworks system should be in operation shortly after the beginning of the New Year, he said. Work is being pushed on the tunnel under the Arkansas river. Night and day forces are being used, and the work has been going forward at the rate of about thirty-five feet a day.

Polluted by Oil Waste.

Anderson, Ind.—Following an investigation of White River between Anderson and Muncie, Dr. S. C. Norris, city chemist, says a strong chemical taste in the water from the Anderson plant is due to drainage of oil and other refuse from a large gas producing plant of the Central Indiana Gas Company at Muncie. Dr. Norris's report was filed with the board of works after a visit to Muncie, and following an analysis of the water. Dr. Norris was accompanied to Muncie by Jay Craven, a chemist, from the state board of health.

Court Fixes Rates.

Pittsburgh, Pa.—Judge J. J. Miller, in Orphans court, handed down an opinion on December 16 which means the saving of thousands of dollars to the consumers of water in Wilkinsburg and adjoining boroughs, which take water from the Pennsylvania Water Company. The opinion of the court is concurred in by Judge Joseph G. Swearingen, who adheres to his former conclusions that the valuation of the water company's holding is \$2,750,000, a reduction of more than \$550,000 on the company's estimate. The court fixed the rates to be charged domestic consumers at 20 cents a hundred cubic feet, instead of 25 cents, as is now charged by the company. The decision is a sweeping victory for the residents of the boroughs, who have been fighting for some time to have the rates reduced.

Water Plant Value Placed at \$2,302,522.

Des Moines, Ia.—A valuation of \$2,302,522 was placed upon the Des Moines Water Company by the condemnation jury composed of Judges Wright, Gaynor and Rancier in a report recently made public. This is almost an even break between valuations claimed by the water works company and the city in proceedings to force a sale of the plant to the city of Des Moines. The officials of the company claimed a valuation of \$3,500,000 and the city placed the valuation at \$1,600,000. The jury has had the matter under consideration for over a year.

Gravity Water Supply for Sweetwater.

Sweetwater, Tex.—Thomas Trammell, president of the water company, has recently returned from Chicago, where he had business in connection with the work of the company to enlarge and make adequate Sweetwater's water supply. The company has acquired 1,280 acres of land for a reservoir site on Sweetwater Creek, seven miles southwest, and will build a reservoir which will have a watershed of over fifty square miles to store water eighty feet deep and send the water into the mains by gravity. It is stated that this will give Sweetwater a water supply ample for a population of 50,000 people.

Water Pipe Line Under River in Danger.

Jersey City, N. J.—Warned by Chief Engineer Charles Van Keuren that the city's only water pipe beneath the Hackensack River which carries the water supply from Boonton to the consuming public, is in danger of breaking at any moment, the mud bottom upon which it was laid having been mostly washed away, the Street and Water Board at its last meeting adopted a resolution calling upon the Board of Finance to act immediately upon a resolution sent it by the Street and Water Board, September 3, awarding to Patrick Connolly a contract to build a duplicate pipe line under the Hackensack to be protected by a tunnel of cast iron with eight inches of concrete lining. The amount asked for to build the tunnel and additional pipe line to insure the city a water supply in case the present pipe line breaks beneath the river, is \$192,397, which would be paid by the issue of long term bonds. The Board of Finance has refused or neglected to take any action and without its concurrence the contract cannot become operative and the money to pay for the work cannot be secured. If a break should occur in the Hackensack pipe now, Mr. Van Keuren explained, there is not enough water in the local reservoir, combined with all that can be purchased from outside sources, to give the city a supply for six days, and after the sixth day there would be a shortage of more than 20,000,000 gallons a day. The city now uses 44,000,000

gallons of water a day, and the most that it could get from the Hackensack Water Company and the New York and Suburban Water Company, upon whom it must depend for an emergency supply, is 25,000,000 gallons. The shortage if a break occurred during February, when householders keep the water running to protect their plumbing, would be 30,000,000 gallons or more a day, as in February last the full Boonton supply of 50,000,000 gallons a day was insufficient for the needs of the city, and 5,000,000 gallons a day had to be purchased from the water companies. There have been two serious breaks in the Hackensack river pipe, one of which it took eighteen days to repair.

STREET LIGHTING AND POWER

Will Extend Waycross White Way.

Waycross, Ga.—Waycross White Way is going to be extended. Plans for the addition of several more blocks in the business section are being made and work will begin on the White Way extension just as soon as the necessary material arrives.

New Light Rate Made.

Junction City, Ore.—The Oregon Power Company, under the direction of the local manager, L. C. Parks has instituted a new flat rate window lighting plan for the merchants. Nearly every merchant in the city has agreed to accept the proposition. The window lights will be turned on at dusk and turned off at midnight, by means of two time clocks.

Install Modern Type Electric Lamps.

Schenectady, N. Y.—Street Commissioner Jones and employees of the electric light company are placing new arc lights in the Wiswall Public Park. The new lights are of the modern type and the carbons last for over a hundred hours and do not need the attention of being removed three times a week as the old ones did.

Will Soon Have Lights.

Glen Ullin, N. D.—The big four-cycle engine to be used in the electric light plant has arrived and the work of putting in place will begin at once. The engine weighs eleven tons and the moving of it from the cars to the engine house will be no small task. The poles for the system are all in and the wires are up and a large number of residences and business blocks have already been wired so that when the engine is in place and tried out the plant will be ready to furnish light. Mr. Hannes expects to have the lights turned on by January 1.

Municipal Gas Plant Shows Big Earnings.

St. Catharines, Ont.—The statement of the operations of the civic gas plant for November, which has just been issued makes a splendid showing of results which cannot be other than very satisfactory to the citizens of St. Catharines. The gross earnings for the month were \$2,184.24, and expenses totalled \$1,753.82, leaving net earnings for the month of \$430.42. The gross earnings for the same month in 1911 were \$1,234.39, showing an increase for the month of over 80 per cent. The November earnings were about sufficient to cover for the city the cost of the 200 street lamps now in commission for that month.

Power Company to Compete with City Service.

Lodi, Calif.—W. W. S. Butler, Manager of the Western States Gas and Electric Company, has announced the intention of his company to sell electric current direct to the consumers inside of the limits of Lodi at the expiration of the contract with the city. When the city was incorporated, bonds were voted to purchase the light and water plants from Cary Brothers. The municipality continued to operate the water works, but instead of generating electricity, bought it from the American River Company and retailed it to the consumers in Lodi. The city had a monopoly on supplying electric current in Lodi. Later the Western States Company took over the American River Company and the municipality became involved with the electric

company in a dispute over bills. The matter was settled by an arbitration meeting and then the electric company injected into the arbitration the question of paying for a transformer. The city will oppose the electric company retailing electricity inside the city limits. The electric company states that it will wire the houses free of cost and will sell service cheaper than the city. The trustees will rely on the Railroad Commission to protect their rights.

Turn On New Boulevard Lights.

Ottawa, Ill.—The new lights on Madison street have been turned on. The poles are forty feet apart and have a cluster of five lights. All the lights will burn until 12 o'clock at night, when they will be turned out with the exception of the top light, which will remain lighted until daybreak. The work of installation was conducted by the Mueller Electric Company.

Collinsville Again Has Electric Lights.

Collinsville, Ala.—The plant of the Collinsville Electric Company, which was destroyed by fire six or eight months ago after having been in operation only a few weeks, has been rebuilt and is again in operation. The new plant has cost about \$10,000 and is modern in every particular. It furnishes power for fifteen street arc lights and about 1,000 incandescent lights for use in the buildings about the city. The plant will also be able to generate some power for commercial use. The new plant is in a fireproof building.

FIRE AND POLICE

Will Try Out Electric Searchlight.

Marion, Ind.—The fire department is to try out an electric searchlight recommended as a very necessary adjunct to fire fighting. Members of the council who have seen the light say it is essential in locating fire in smoky buildings. One light will be purchased for Fire Chief Crearer to try out, an appropriation ordinance of \$24 being made for the purchase. If it is as effective as it is claimed to be, other fire stations than central will be supplied with the searchlights.

Thought Dead, Firemen Revived by Pulmotors.

Pittsburg, Pa.—Forty minutes after they had been declared dead of suffocation, seven of the twelve firemen overcome at the destruction of the Westinghouse electric plant in First avenue, December 25, were revived at the Homeopathic Hospital. It is said that all will recover. The blaze started shortly before five o'clock in the morning and for hours, fanned by a gale, it threatened to wipe out the big wholesale district along the Monongahela River front. Damage from fire and water will total \$250,000. Twelve firemen were taken from the ruins during the morning. Seven were pronounced dead of suffocation. All were hurried to the hospital, which the week before had been equipped with pulmotors. To these the men owe their lives. Pulmotors will be added to the fire department equipment at once.

Each Cop a Walking Vulcan.

Philadelphia, Pa.—The "Trouble Killer," "Electric Quieter" and "First Aid to Careful Cops" are some of the titles applied to a brand new instrument to be exhibited presently before Director Porter, Superintendent Robinson and other police officials by the inventor, Jeremiah Cresdon, an engineer on the Philadelphia & Reading Railroad. The device consists of a belt to be worn by every policeman on duty, attached to which is a battery with wires running up along

the body and down through the sleeve and ending in a metal button. The policeman wears a rubber glove on whichever hand the button rests, and when he grabs a prospective prisoner the captor will surely wilt when that button with the neat little voltage touches his anatomy. The device was patented only a few days ago, and the model works so efficiently that Cresdon believes that every police force in the country will want them. He believes it will be useful in asylums whence every now and then come stories of cruelty on the part of keepers trying to subdue their insane charges.

Favors Police Matrons.

Wilmington, Del.—Speaking before a meeting in the New Century Club under the auspices of the civics committee, Mayor Harrison W. Howell declared himself in favor of the plan to have a woman appointed to the Wilmington police force. He urged the association to take definite action to have a woman appointed and as a result it was decided to refer the matter to the juvenile court.

Alarm System Is Being Installed.

Oak Park, Cal.—A crew from the city engineering department is at work installing high poles along Cypress avenue, which will carry the alarm system from the fire house to the Oak Park Water Company's pumping plant so that a signal may be given when high pressure is needed in case of a fire. The poles will also carry the trunk line for the regular alarm system which will be installed throughout the annexed district after the first of the year. Surveys and estimates have already been made by the city electrician for this work. The trunk line will be installed first, and the laterals connecting up fire alarm boxes in remote sections will be installed as soon after as possible. At the present time the residents of the annexed district must use the telephone in order to give an alarm for a fire.

Firehouse at Westfield.

Westfield, N. J.—An illustration is given of Westfield's fire house and equipment, which comprises a motor fire engine fully equipped and carrying over 1,000 feet of hose. A combination chemical and hose motor apparatus, a Seagrave hook and ladder truck, and a hose wagon and four horses, all of which are housed in the \$25,000 firehouse.



Courtesy Elizabeth "Journal."

WESTFIELD'S FIRE EQUIPMENT.

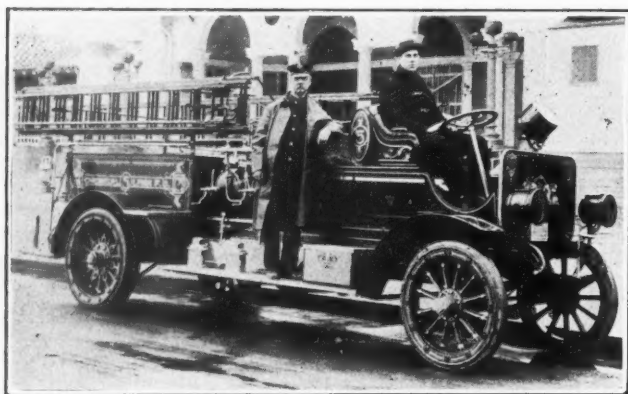
MOTOR VEHICLES

Asks for Motor Ambulance.

Lowell, Mass.—The mayor is now making investigations to supply the charity department with a motor propelled emergency ambulance. He feels that one is badly needed in Lowell, especially for long runs, and chances are that the city will soon be equipped with a modern, up-to-date auto ambulance. The auto patrol which is now undergoing a thorough overhauling, will be ready soon.

New Auto Chemical for Wyoma Station.

Lynn, Mass.—The new Seagraves' chemical, an illustration of which is given, is the latest addition to the auto fire equipment. The new machine will be known as Chemical 5, L. F. D., and will be stationed at the Wyoma House. It is perhaps better adapted to this section than any of the



Courtesy Lynn "Evening Item."

CHEMICAL AT WYOMA FIRE STATION.

other makes, on account of the makeup, being much longer and a little wider than any of the other motor equipments. The engine is a six-cylinder, extra heavy, and the tires are solid with dual tires on the rear wheels.

Add Second Automobile to Fire Equipment.

Wilmington, Del.—The Reliance Fire Co. has installed a second automobile fire engine.

Pumping Engine Tested.

Jersey City, N. J.—The Dixon Cascade Pump Company, Newark, N. J., exhibited their new combination automobile engine in Jersey City, December 21, before Mayor Wittpenn, Commissioners Donnelly, Quirk and Sack, Fire Chief Conway, Battalion Chief Daly and other members of the department. Seven pumping tests were applied, four in which the engine sucked water from the canal and three in which the usual method of supply from hydrants was applied. With a 1½-inch nozzle attached to a 2¼-inch hose 150 feet long and 82-pound nozzle pressure, 678 gallons of water were pumped a minute and sent a distance of about 250 feet. Two lines of hose 200 feet long, siamesed, with a 1½-inch nozzle of 80-pound pressure, 596 gallons of water were pumped in a minute and sent over a seven-story building. Four lines of hose 50 feet long, siamesed with 2-inch nozzle of 70 pounds pressure, drew 994 gallons a minute, and four lines of 2½-inch hose fifty feet long with 1½-inch nozzle, 68-pound pressure, forced 1,140 gallons of water a minute to heights of seven stories. The tests from water hydrants were even better, four 50-foot 2½-inch hose with 1½-inch nozzle, the lines siamesed under 76 pounds nozzle pressure and 90 pounds pump pressure, threw water 1,304 gallons a minute a distance of 300 and over seven stories high.

Plans Exhibition of Fire Equipment.

Butte, Mont.—An important and interesting fire exhibition is the plan of Fire Chief Peter Sanger. It is planned to have the exhibition January 15 at one of the school-houses when the children may have a fire drill at the same time. If the motor equipment arrives by that time the "flying Squadron" and the combination hose and chemical auto will be put into use. They have not been shipped from the Segrave factory at Columbus, O., but it is expected that they will be sent out soon, and the time in transit is just one week. Chief Sanger will erect a 72-foot wooden tower at the Quartz street station within the near future and will set it afire at night and then have his men put out the blaze. The aerial truck will be put to a test at that time. Another new system has been placed in use. The city has been entirely redistricted so that in case of a fire anywhere the auto apparatus may be used. The new lines which have been laid will add much to the effectiveness of the department.

Fire Truck Skids on Icy Street.

Springfield, O.—Skidding on the icy street while going at a rapid rate in answer to a fire alarm, the large automobile fire truck dashed into a water plug at the corner of Monroe street and Fountain avenue. The fender was broken off and the crankshaft bent, while the heavy machine broke the water plug off close to the ground. The momentum carried the machine on to the curb, while all of the firemen stuck to their places and were not hurt. Chief Samuel Hunter who was on the truck and the men inspected the machine and a moment later it was backed off the curb and was on its way to the fire, a fast run being made. Driver Nick Beilstein said the machine started to skid and in a second had dashed into the plug. Chief Hunter stated that several of the men might have been killed had the brakes not been applied instantly.

Tractor Used for General Purposes.

Springfield, Mass.—The Martin tractor, which was first introduced by the Knox Automobile Company as a means of locomotion for steam fire engines and other heavy fire apparatus which were considered too valuable to discard and needed modernizing, is finding a wider field. Basing their views on the experience of a number of companies that have used the tractors in ordinary commercial service, one instance of which is shown in the illustration, the Knox Company now recommend the Martin tractor to contractors and supply dealers having much heavy hauling to do. It is claimed that the results well justify the cost of the tractor, the old wagon body still being used.

Auto Apparatus Reduces Fire Loss.

Macon, Ga.—The report of fires kept by Inspector William Jordan shows that within the past year the department has answered 318 fire alarms. That heavier losses by fire would have resulted last year is the belief of the firemen



MARTIN TRACTOR HAULING HEAVILY LOADED WAGON.

had it not been for the auto fire apparatus and the latest of fire-fighting methods. The local department is one of the best in the south and has a reputation everywhere over the country for having the best fire machines of any city in the south for its size.

New Auto Apparatus Arrives.

Lowell, Mass.—The new automobile combination fire apparatus for the High street engine house has arrived from the factory of the Knox Automobile Co. in Springfield. Upon reaching Lowell the machine was taken to the central fire station, where it will remain until after being given a trial and accepted by Commissioner Barrett. This machine is one of the latest and best types of self-propelled vehicles turned out by the Knox Co. and is a combination chemical, hook and ladder and hose car. It will be a valuable acquisition to the department and will afford much better protection to the Belvidere and Oaklands districts. It resembles the automobile Protective in several ways, but a close examination will show that the equipment is much different. The length of the chassis and body of the car, together with the width, are practically the same as that of the Protective as is the radiator and shape of hood. The engine has four cylinders and although rated at only 50 horse-power it will develop considerably more and has more speed than will really be needed when responding to alarms. It is also a good hill climber, which is one of the essential points necessary for a machine located in the hilly district of Belvidere. Unlike the Protective, there are no seats in the new machine, other than the two in front, one of which is for the driver and the other for the captain of the company. The body will hold 1,500 feet of hose while on one side is a 20-foot extension ladder and on the other a 12-foot roof and wall ladder. The wheels are equipped with Motz solid tires which are of the quick demountable type, those in front being single with a channel, while those on the rear are dual with channels. They are practically non-skid tires and are especially designed for heavy apparatus. It is finished in a deep vermillion. On either side of the hood is the inscription "Lowell Fire Department" in gold letters, while the lettering on the side of the body reads "Engine Co. No. 4."

GOVERNMENT AND FINANCE

Ohio Bondholders Stamped.

Columbus, Ohio.—Owing to the fact that after January 1, Ohio municipal bonds will be taxable, \$30,000,000 bonds have been thrown on the market since September 31, when the constitutional election was held. The market is congested. It now is impossible to get a premium on bonds bearing 4 per cent. During the third week of December public bond issues in Ohio totalled \$8,500,000. These have been rushed so as to be marketed before January 1.

Municipal Regulations Adopted by German City.

Berlin, Germany.—Police regulations which are to be put into effect in Berlin April 13 will bar whistling and cane swinging and prohibit persons walking more than three abreast on the streets. Copies of the regulations include these and other unusual restrictions as follows: Persons may not walk more than three abreast or stop or congregate for any extended period of time. Persons with umbrellas or walking sticks must not carry or swing them in any manner likely to imperil the safety of passersby. No windows or doors of houses, flats, shops or restaurants in which music is being played may be kept open. No whistling, singing, shrieking, shouting or loud talking of any kind likely to endanger the quiet of the streets is to be permitted. Teamsters in charge of wagons, trams or trucks loaded with resounding metal of any kind are forbidden to drive in a manner calculated to cause nerve-shattering noises. No paper, remains of fruit, cigars or cigarettes may be thrown into the streets. The dragging of clothes of any kind—women's dresses or anything else capable of producing dust—is prohibited.

Official Vote on Highway Bonds.

Albany, N. Y.—The proposition submitted to the voters relating to bonding the State for higher improvement was adopted by the following vote: In favor of the proposition, 637,548; against, 281,265.

Plan a Model Charter.

Philadelphia, Pa.—The National Municipal League is undertaking to draft a model municipal charter and the Bureau of Municipal Research an administrative code for the cities of New Jersey to present to the New Jersey Legislature at its session which begins in January. In order to unify the work of these two organizations a committee was appointed to review the whole system of municipal legislation in order to determine what should profitably go into the State Constitution, into the general laws of the State, into the special city charters, and into the administrative codes of the cities and other ordinances. The scope of these several branches of legislation having been thus determined, the Municipal League will draw up its model charter and the Bureau of Municipal Research its model code, each supplementing the other. The committee is composed of Robert W. Belcher of the National Civil Service Reform Association; William Dudley Foulke, president of the National Municipal League; Henry Bruere, Herman A. Metz, J. Hampden Dougherty, Richard S. Childs, Raymond Fosdick, ex-commissioner of accounts, New York City, and Clyde L. King of the University of Pennsylvania.

Surplus Shows City Has Been Economically Run.

Topeka, Kan.—The board of city commissioners of Topeka have nearly \$50,000 in the city treasury with which to pay all bills for the year 1912. From a report issued by Roy L. Bone, city commissioner of finance, it is shown that out of the budget for 1912, amounting to \$459,600, less than \$415,000 has been spent. This is an exceptional record for a city working under a whittled budget when other cities are facing serious shortages. In nearly every city department it is figured that a short balance will be left to be applied on the expenses for 1913. Despite the conditions the Topeka commissioners faced last year, they have been able to keep down the expenditures under the amount provided for them in the budget made in the summer of 1911. At the same time all departments have been maintained up to standard, and the city is in good condition for the beginning of the 1913 budget. The commissioners were elated over the discovery that they had nearly \$50,000 with which to carry them through to the first of the year. Other cities under the commission form have a new year of trouble and anxiety staring them in the face.

Mayor Tells of Benefits of Commission Government.

Galveston, Tex.—After 12 years of experience there are few, if any, citizens of Galveston who would dare say the commission form of government as adopted by Galveston following the storm of 1900 has not been a success in every sense of the word and has not been in a large measure the means of rebuilding the city and inducing the present great degree of prosperity that pervades business and building activities.

Mayor Lewis Fisher says the Galveston plan has no real provision. It is ideal in that it is based on the idea of absolute authority of each commissioner in his department, the whole being backed by an alert citizenship. To summarize the accomplishments of the Galveston commission government: Under the aldermanic plan for several years prior to the establishment of the commission government the annual budget had exceeded the income by about \$100,000 and every two years the legislature was asked for authority to issue bonds to the amount of \$200,000 to meet this floating indebtedness, which in 1901 amounted to \$204,974. This floating debt has been paid. The seawall and grade-raising were designed by a board of engineers and carried out, entailing an expenditure by the city and county of more than \$4,000,000. The City Hall has been rebuilt,

the waterworks system has been rebuilt and extended, several engine houses have been built, the sewer system has been extended, many streets have been paved, representing an expenditure of more than \$500,000. A drainage system has been provided at a cost of nearly \$500,000, a number of old judgments inherited from former administrations have been paid, interest on outstanding bonds has been reduced and nearly \$1,000,000 of the bonded debts have been received. All this has been done under the commission government without any increase in the city tax rate and without issuing a dollar in bonds except bonds issued for protective purposes.

STREET CLEANING AND REFUSE DISPOSAL

Plant Corn in City Streets.

Keokuk, Ia.—Business men, indignant because dirt a foot deep has been allowed to accumulate on some Keokuk streets, planted corn on one thoroughfare as a means of rebuking certain city officials whom they blame for not keeping the streets clean. The fire department was called out to wash off the dirt. Scarcity of city funds is held partly responsible for the condition.

City May Sell Its Garbage.

Grand Rapids, Mich.—Grand Rapids may be able to realize 60 cents a ton on its garbage next year instead of paying the Utilization Company that amount for disposing of the refuse. Alderman John Doan wants the council to build a retaining vault for garbage on the island where farmers and others may come for the garbage, paying for the amounts taken. He contended that the city can dispose of every pound of the collection. Peter B. Gast, Ben Vink, William Andersch, and Dr. Edward V. Viotor, feeders of hogs, appeared before the special garbage committee with a request that the Doan proposition be carried out. They agreed to take 25 tons a day and to put up a bond that the agreement will be kept. Dr. C. C. Slemons of the health board stated that the total daily collections range from 80 to 125 tons a day and that 90 tons a day are being collected now. The health board has no objections to offer as to who shall get the garbage, but does insist that the garbage be taken every day as collected. Bad roads, Dr. Slemons contended, would prevent farmers from coming every day. It was brought out in the discussion that no matter what arrangements are made now for garbage disposal, the city must in a very short time prepare to build its own garbage reduction plant and be relieved of the necessity of depending upon hog raisers to use the garbage. If contracts can be made with farmers and others to take a maximum amount of 125 tons a day, the Doan proposal may be recommended.

Garbage Plant Open.

Boston, Mass.—After a delay of more than five months, the Boston Development & Sanitary Company has started operations on its \$1,500,000 contract for the disposal of the city's garbage for the next ten years. Although the contract also provides for the disposal of waste, refuse and ashes, the company will be unable to handle that portion of the work until after the beginning of the new year, when its incineration plant at East Boston will be in readiness. For the disposal of the garbage, the concern has established on Spectacle Island one of the most up-to-date reduction and disposal plants in the country, according to Commissioner Rourke of the public works department, under whose supervision the contract was made. The plant was erected on land furnished by the city, and, according to assurances given the commissioner, the garbage will be disposed of in a thoroughly sanitary and odorless manner. According to the provisions of the contract, the garbage will be collected in the customary manner and deposited in the various receiving stations erected by the public works department. From those sta-

tions the garbage will be taken to the waterfront stations from where the garbage will be shipped in metallic sealed receptacles on scows to the Spectacle Island plant. Since July 1, Commissioner Rourke has been dumping all the garbage and refuse, more than 200 tons daily, at sea. The scows were towed out 28 or 30 miles and unloaded. Prior to that time the city paid the New England Sanitary Product Company some \$52,000 a year for disposing of the garbage, but when the product company's contract expired the commissioner relieved that concern of the work rather than pay 50 per cent. additional for the garbage disposal until the Boston Development & Sanitary Company was ready to start. Under the terms of the contract, the city will pay only a portion of the contract price until the new concern handles both the garbage and refuse. That amount will be determined by the quantity of garbage and refuse handled until the refuse incinerator at East Boston is completed.

Toledo to Be Spotless Town.

Toledo, O.—Toledo will be a spotless town after this winter if it takes all the policemen, revision of the license laws and reorganization of the work in the street department to bring about the condition. The subject was discussed thoroughly in the office of Mayor Whitlock with Safety Director J. J. Mooney, Service Director J. R. Cowell and Superintendent of Streets Peter McNerney. The plan provides for the establishment of a municipal junk shop where all paper and rubbish collected in streets and alleys can be sorted by workhouse prisoners and sold, the money to be added to the street cleaning department funds. Sidewalk obstructions such as signs, displays of fruits and merchandise will have to be removed says the mayor, and the merchants must be educated before spring not to sweep the dirt from their stores on the street or to sweep their sidewalks during the day. It is planned to have an ordinance prohibiting sweeping except during certain hours in the night. It was agreed at the meeting that the distribution of hand bills has a great deal to do with the untidy condition of the street, and before spring the city officials plan to do away entirely with this form of advertising by repealing the part of the license law covering the passing of bills.

RAPID TRANSIT

Five Cent Fare to Coney.

New York, N. Y.—To Coney Island for five cents, and in the summer time, too, via rapid transit. This is practically assured as a result of the final agreement on the details of the operating contract for the dual rapid transit system reached by Borough President McAneny. Under the original plan a period of about five years was to elapse before the through trip to Coney Island from Manhattan, the Bronx or Brooklyn could be made for five cents. By the new agreement, however, the B. R. T. is forced to adopt terms which will bring the long-hoped-for boon within actual hailing distance.

No Adequate Pay To City for Street Railway Privileges.

Des Moines, Ia.—That there is no adequate consideration to the city for the valuable grant held by the city railway company, is the contention of Corporation Counsel H. W. Byers in his final reply filed with the Supreme Court. This is the last legal proposition submitted to the Iowa Supreme Court before that body at its January term will be called upon to decide the famous Des Moines case. General Byers maintains that it is a rule of law that there can be no contract between parties without adequate consideration. He insists that the document passed by the Des Moines council in '66 making terms which would be a consideration in law to a small town of 7,000 people, wholly fails to afford terms which are a consideration or value received for the enormous value that attaches to a grant for street car privileges to-day.

MISCELLANEOUS

Two Cities Have Municipal Yule Tree.

Boston, Mass.—A giant Christmas tree ablaze with red and blue lights cast its glow over Boston Common and the neighboring streets while a band discoursed music and various singing societies caroled old-time melodies. It was the city's first municipal Christmas tree. The unusual program of music and song attracted thousands. The celebration was continued until midnight.

New York, N. Y.—On the night of December 24th, electric lights were turned on the 60-foot Christmas tree placed in Madison Square. The power was turned on every night until after the first of the year.

Will Use Dynamite for Trees.

Fort Worth, Tex.—With the aid of dynamite, Park Superintendent Vinnedge expects to revive many of the old trees in the parks, as well as strengthen the growth of the younger trees to be planted during the winter. Dynamite planted at the root of an old tree is said to have the effect of reviving it to a new growth. A small charge fired in the cavity for a young tree loosens the earth and makes many crevices into which the roots may project and grow without injury. Superintendent Vinnedge says that the tree planting this winter will be larger than usual. In several of the new parks shrubbery and many new kinds of small growth trees will be planted.

First "Hiking" Party a Great Success.

Brookline, Mass.—The first of a series of hiking parties arranged by Director J. Leonard Mason of the Municipal Gymnasium and Baths has proved a great success, a large number of young men joining in the "hike." The party traveled over the south section of the town to the Putterham Reservation and was surprised to find so many delightful by-paths.

City to Pay for Dentists' Work.

Spokane, Wash.—The municipal free dental clinic, which has been closed down for some time through lack of appropriation by the city council to carry it forward, is to be re-established during 1913, and with paid dentists, instead of dentists donating their services, when they could, as a matter of charity. The city charity board has made arrangements for the employment of two dentists, members of the Spokane County Dental Association, to work two afternoons a week for nine months during 1913, for a consideration of \$500, the association from time to time to assign different dentists for the work. This is to be paid for out of the 1913 charity fund. The charity board has asked the city council for an appropriation of \$400 out of the 1912 charity fund for supplies and equipment for the clinic. The charity fund of 1912 has a balance of \$617.28 remaining and the money is therefore available. The recommendation was referred to Mayor Hindley for a report and it is expected it will be allowed by the council. The municipal free clinic takes care of the dental work for hundreds of children who are inmates of the various charitable institutions of the city. The scope of the work may be extended next year to include work for children who are too poor to pay for it other than inmates of institutions.

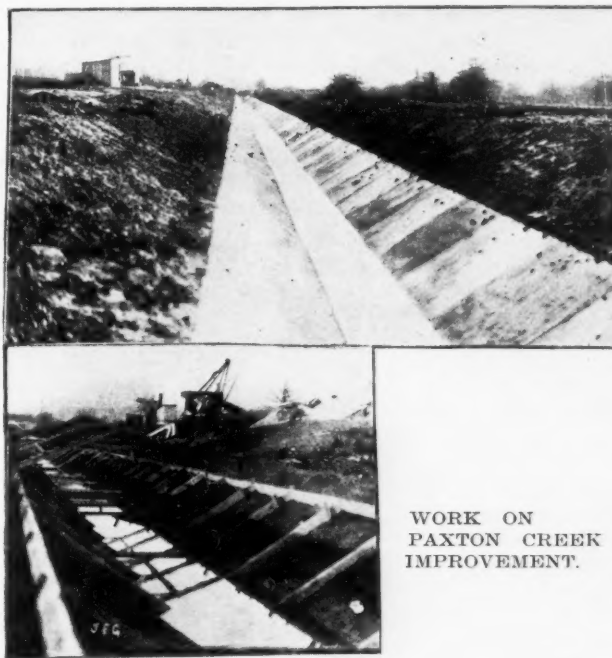
Cold Storage Plant for Public Market.

Seattle, Wash.—Enlarged public markets with cold storage facilities to enable the municipality to compete with private concerns, is the solution for the high cost of living offered by Mayor George F. Cotterill. "Our present public markets are good, but they should be considered only a beginning," said Mayor Cotterill. "To make a public market thoroughly effective, cold storage should be provided in connection with it. The producer who sends his goods to market would have means of keeping them until sold, instead of being forced to make an immediate sale at a loss. He could compete with concerns operating cold storage plants and the scope of the market would be greatly increased." Mayor Cotterill said a comprehensive plan for enlarging the Seattle public markets and increasing their scope of operations would be offered the city in a short time. The elimination of middlemen's

profits in the necessities of life is an important feature of reducing the living cost and one in which the city has the power and the opportunity to do much to help its citizens," said the Mayor.

Paxton Creek Improvements Progressing.

Harrisburg, Pa.—The work on the Paxton Creek improvements is being rushed as rapidly as possible by the contractors. The upper picture shows the concrete work in



WORK ON
PAXTON CREEK
IMPROVEMENT.

Courtesy Harrisburg "Patriot."

the creek bed, started some few weeks ago at Maclay street. The lower picture shows the work before the concrete is placed.

Sidewalk Advertising is Ordered to End.

Des Moines, Ia.—Chief of Police Jenney instructed police officers to bring to the station all persons carrying advertising signs, driving advertising wagons or in any way using the streets of the city for advertising purposes. His action follows a complaint made by the Commercial Club and resulted in the unearthing of an old ordinance which prohibits the use of the streets for purposes of this kind.

Council Tree of Creeks Is Saved.

Tulsa, Okla.—Tradition and sentiment has saved a giant tree known as the Creek council tree, which stands in the center of South Cheyenne street in Tulsa. An ordinance to pave the street was adopted recently and some of the citizens wanted the tree destroyed, but a decision to spare it has been reached. Beneath the tree, it is said, are buried the ashes of the Cherokees, brought from the old council ground in Georgia when the Creeks came to the Indian Territory over 75 years ago. Where the tree stands the first important meetings of the tribe were held.

Use Municipal Farm in Reclamation Plan.

Los Angeles, Cal.—At a rental of \$120 a year the board of education has agreed to lease the Parental Home, on the Los Feliz road, in the lower San Fernando Valley, to the city for a municipal farm for the reclamation of men from the liquor habit. The use of the buildings and seven acres of land was requested by Judge G. H. Hutton, Mrs. O. P. Clark and Mrs. W. S. James, representing the Psychopathic Parole Association. The lease is to be for a period of one year, with a privilege of three. The building is expected to accommodate about twenty-five persons, and the acreage, much of it occupied by blackberry fields, will give outdoor occupation to the men selected from police court habitués for restoration. Chief Sebastian plans to utilize it as an arm of humane police work in eliminating the habitual drunkards who are so often before the courts and for whom now there is no alternative but chain-gang work.

LEGAL NEWS

A Summary and Notes of Recent Decisions— Rulings of Interest to Municipalities

Taxation—Uniformity.

Shane et al. v. City of Hutchinson et al.—A statute which exempts residents of cities of the first class from the operation of a statute imposing a poll tax for road purposes does not violate the rule requiring uniformity in taxation, nor result in a denial of the equal protection of the laws—Supreme Court of Kansas, 127 P. R., 606.

Taxes—Trusts—Personal Property.

Smith et al. v. Town of Dunn et al.—Revisal 1905 provides that personal property held by a trustee is taxable where the cestui que trust resides. Revisal 1905 provides that towns having charter power to tax property may list property which has escaped taxes for a period not over five years, adding to the simple taxes 25 per cent. Held, that property listed by trustees in the township where they lived, and not where the cestui que trust resided, and which was not listed for town taxes could be listed by the town as property which had escaped taxes under Revisal 1905.—Supreme Court of North Carolina, 765 E. R., 242.

Streets—Damages to Abutting Owners.

Town of Basic City v. Bell.—In trespass on the case for damages suffered by an abutting owner from the flowing by a municipal dam of the only street which gave him ingress and egress from his property, evidence that since the erection of the dam a new and better street giving access to this property had been opened is admissible on the question of the amount of damages; such evidence not tending to show a diminution of damages, but that no damage was suffered.—Supreme Court of Appeals of Virginia, 76 S. E. R., 336.

Payment of Taxes Under Protest.

Connelly v. City and County of San Francisco.—Pol. Code, authorizing payment of taxes under protest and an action for the recovery thereof does not limit the right of action to attacks on the assessment but authorizes an action attacking a tax levy.—Supreme Court of California, 127 P. R., 835.

Defective Street—Unguarded Embankment.

Bean v. City of Portland.—Under Rev. St., which authorizes recovery for injury to travelers caused by defective streets, a city is liable for injury to a traveler, who, in the nighttime, drove over an unguarded embankment at the end of a street, which the city was under the duty of maintaining and protecting, the traveler having exercised due care for her own safety, regardless of whether the city has a remedy over against a railroad company, whose right of way joined the street at the place of the accident.—Supreme Judicial Court of Maine, 84 A. R., 981.

Sewer Contract—Construction—Extras.

First National Bank v. City of Seattle et al.—Where the relaying of a sewer pipe by a contractor was occasioned from its having been improperly laid out of alignment in the first instance, the city was not liable for such relaying of pipe, though it had made a slight change in the grade, which was in no wise responsible for the additional work. Where a sewer construction contract provided that claims for extras must be presented before final acceptance of the work, and no claim was presented for relaying pipe, the fact that the city allowed as an extra for the relaying of part of the pipe did not entitle the contractor to recover as an extra for the relaying of the remainder of that relaid. Under a sewer construction contract providing that the contractor should pay for all labor and assistance upon the work, and that any and all payments under the contract could be withheld until such wages or assistance were fully paid, and that 70 per cent. of the amount earned should be paid the contractor as the work

progressed, and the remaining 30 per cent. be retained to secure the payment of laborers and materialmen, the city was entitled, after having exhausted the 30 per cent. in payments to lien claimants, to apply the balance on hand of the 70 per cent. to the payment of labor and material in preference to the rights of the contractor's assignee, especially where the assignment stipulated that it was not valid as against any claim for labor and material furnished in the prosecution of the contract.—Supreme Court of Washington, 127 P. R., 837.

Municipal Officers—Compensation.

Elder v. City and County of Denver.—A city treasurer of the city and county of Denver, who has received his salary as such, cannot recover an additional salary as county treasurer of such city and county, since Const. art. 20, creating a new body politic by combining the old city of Denver, the included municipalities, and the old County of Arapahoe, did not create a dual government therefor, with a double set of officers, but provided a single set of officers to perform in the new municipality all duties of a local nature, and all those pertaining to governmental, State, and County affairs as well, especially where such city treasurer performed his duties without thought of additional salary; the suit therefor being merely an afterthought.—Supreme Court of Colorado, 127 P. R., 949.

Payment of Municipal Indebtedness.

Carlstadt Nat. Bank v. Borough of Hasbrouck Heights.—By virtue of the control of municipal corporations, which is vested in the Legislature whose governmental agencies they are, it was competent for the Legislature to pass the act approved April 6, 1911, and thereby impose upon municipalities an obligation to repay money which had been loaned to such municipalities under the circumstances therein set forth, and such legislation is not obnoxious to the fourteenth amendment to the federal constitution, and by it property is not taken without due process of law.—Supreme Court of New Jersey, 84 A. R., 1069.

Change of Street Grade—Injunction.

Shackleford v. City of Jefferson.—The act of a city in attempting to change at its expense the established grade of a street, thus increasing taxation, when under Rev. St. 1909, it may change it only after compensating the abutting owners for damages therefrom, to be paid for by assessment of private property within a certain limited district, gives a taxpayer the right to enjoin the illegal proceeding.—Kansas City Court of Appeals, Missouri, 150 S. W. R., 1123.

Violation of Ordinance—Evidence—Reasonable Doubt.

City of Stanberry v. O'Neal.—Though a prosecution for violation of an ordinance is in form civil action, it being criminal or quasi criminal in character, defendant on trial in the Circuit Court, on appeal from a conviction, is entitled to an instruction that he must be believed to be guilty beyond a reasonable doubt; at least where the offense is also a violation of State law and malum in se, as disturbing the peace by quarreling and fighting, and loud and indecent language.—Kansas City Court of Appeals, Missouri, 150 S. W. R., 1104.

Dead Animals—Removal—Ordinances.

City of Moberly v. Lash.—Defendant, a veterinarian, was engaged by S. to extract a tooth from the mouth of his horse, and while doing so the horse suddenly died. S. contracted with a negro to dispose of the body, after which S. left for his home in the country. The negro did not carry the horse away on the next day; whereupon defendant notified the city authorities, and, they doing nothing, he, on the next morning, had the body removed. Held, that defendant was neither the owner nor in possession of the body, and was therefore not guilty of violating an ordinance declaring that the owner or person in control or management of any horse, etc., which shall die within the city shall remove it outside the city limits within twelve hours after its death, and bury or burn it.—Kansas City Court of Appeals, Missouri, 150 S. W. R., 1140.

NEWS OF THE SOCIETIES

Calendar of Meetings.

December 30-January 6.

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.—Annual meeting at Cleveland, O. L. O. Howard, Secretary, Smithsonian Institution, Washington, D. C.

January 11-25.

THIRTEENTH NATIONAL AUTOMOBILE SHOW.—Madison Square Garden and Grand Central Palace, New York City. H. W. Perry, Manager, 7 East 42d Street, New York City.

January 21-23.

AMERICAN SOCIETY OF HEATING AND VENTILATING ENGINEERS.—Annual meeting at New York City. W. W. Macon, Secretary, 29 West 39th Street, New York City.

January 21-23.

AMERICAN WOOD PRESERVERS' ASSOCIATION.—Annual Convention, Chicago, Ill.—F. J. Angus, Secretary, B. & O. R. R. Co., Baltimore, Md.

January 22-23.

OHIO MUNICIPAL LEAGUE.—First Annual Meeting, Columbus, O. Mays Fesler, Secretary, 825 Engineers' Building, Cleveland, O.

January 17-18.

COLORADO GOOD ROADS ASSOCIATION.—Annual Convention, Denver, Col.—W. H. Emmons, Secretary, Denver.

January 17-18.

AMERICAN SOCIETY OF CIVIL ENGINEERS.—Sixtieth Annual Meeting, Society House, New York City.—Chas. Warren Hunt, Secretary, 220 W. 57th Street, New York City.

Ohio Municipal League.

The executive board of the Ohio Municipal League, of which Mayor Newton D. Baker, of Cleveland, is President, and Mays Fesler, Secretary, has issued a call for the first annual meeting of the League in Columbus on Wednesday and Thursday, January 22 and 23. The League was organized last January at a conference of delegates from 52 cities called to frame the proposed home rule amendment to the constitution.

The mayors of 82 cities and 259 incorporated villages in the State are requested to appoint delegates to this meeting, the number from each city to be based upon the population.

A program is being prepared by the executive board for three sessions, Wednesday afternoon, Wednesday evening and Thursday morning. It is expected that the Smith one per cent. tax law will be one of the subjects for discussion.

The chief feature of the program will be the consideration of proposed legislation affecting cities and villages under the home rule amendment. A committee consisting of A. R. Hatton, Newton D. Baker, D. E. Morgan, W. A. Greenlund, W. L. Flory, H. M. Roberts and Stephen S. Stillwell, is framing legislation for three types of city government; the commission form, the city manager form and the federal plan. Under the constitution any municipality in the State by a vote of its citizens can adopt any one of the forms approved by the legislature. The committee expects to have these proposed drafts completed and mailed to the delegates in advance of the annual meeting. After full discussion by

the delegates the amended bills will be placed in the hands of some members of the legislature for introduction.

The mayors of the larger cities of the State have expressed their intention of being present and will take an active part in the discussion.

The sessions will be held at a time when the members of the General Assembly can attend.

The election of officers will close the program on Thursday. The executive board of the League is composed of:

Mayor Newton D. Baker, Cleveland; Elliott H. Pendleton, Cincinnati; Mayor F. A. Hartenstein, Youngstown; Mayor J. J. Miller, Springfield; David Gottlieb, Tiffin; Mayor Brand Whitlock, Toledo; Fred. W. Herbst, Columbus; A. Julius Freiburg, Cincinnati; Mayor C. H. Slaughter, Athens; William S. Crandall, Dayton; Mayor A. A. Perrine, Mt. Vernon.

Maine Society of Civil Engineers.

The road committee of the Maine Society of Civil Engineers met at the State highway office, Augusta, Me., Dec. 18, to discuss the road conditions of the State. This committee will make a report to the society at the annual meeting to be held next February. Those present were State Highway Commissioner Hardison, Assistant L. D. Barrows, J. E. Kaulfuss of Orono, H. B. Alvord of Brunswick and Harry E. Green of Waterville.

American Society of Civil Engineers.

The sixtieth annual meeting will be held in the Society House, 220 West 57th street, New York City, January 15-16. By the invitation of George W. Kittredge, Chief Engineer New York Central Railroad, and G. A. Harwood, Chief Engineer Electric Zone Improvements, a party will be organized to inspect the Grand Central Terminal Improvement. The party will assemble on Lexington avenue, opposite 44th street, at 2.30 p. m. January 15.

At 9 p. m. the President will hold a reception at the Society House.

On January 16, at 10.15 a. m., a special train will leave Grand Central Station with a party to inspect the Ken-sico dam. The party will be the guests of Contractor H. S. Kerbaugh, Inc.

At 8.30 p. m., there will be an informal smoker at the Society House.

Applications of members for tickets should be sent not later than January 11 to the committee in charge, composed of George W. Tillson, Arthur S. Tuttle and Chas. Warren Hunt.

New England Water Works Association.

The annual meeting of the association will be held at Hotel Brunswick, Boston, January 8.

Reports of special committees will be received on the following subjects:

"To Prepare a Standard Specification for Fire Hydrants." "To look

after and keep track of Legislation and other matters pertaining to the Conservation, Development and Utilization of the Natural Resources of the Country." "Our Water Consumption and Statistics Relating Thereto." "To collect information as to Low Water Yields of Catchment Areas in New England, and at their Discretion, Outside of New England." On "Standard Specification of Cast Iron Pipe."

The following papers will be presented: "Experience with Water Rams," by Charles W. Sherman, principal assistant with Metcalf & Eddy, Boston, Mass. "The Water Works of the City of Lowell and some Recent Improvements," illustrated by Robert J. Thomas, Superintendent, Lowell, Mass.

Maryland State Turnpike Association.

The ninth annual session of the association was held in the court house, Hagerstown, Md., December 19. Delegates from nearly all the turnpike companies in the State were present.

The officers for the ensuing year were elected: President, Thomas A. Murray, Baltimore City; Vice-President, Alex. Armstrong, Jr.; Secretary and Treasurer, O. C. Warehime, Frederick; Counsel, Geo. R. Dennis, Frederick. The executive committee was named as follows: Carroll County, Dr. J. H. Billingslea, A. P. Snoden; Washington County, H. H. Armstrong, A. C. Strite; Frederick, R. C. Dutrow, Daniel Wolfe. The following legislative committee was appointed: Geo. R. Dennis, Daniel W. Doub, Dr. J. H. Billingslea, Thomas A. Murray, Noah E. Cramer, D. W. Groh and O. C. Warehime.

President Towson, in his address, spoke of the charge sometimes made against the turnpike people that they were a dangerous trust and said he thought they were in danger of becoming philanthropists if traffic continued to increase as it had in recent years, because the companies had no legal right to raise their charges.

A. C. Strite read a paper in which he praised the turnpike system as compared with free State roads. He said that the new State roads did not remain new long and mentioned a section built in 1911 west of Boonsboro which he said was already full of holes. He thought the problem of durable road construction at moderate cost is unsolved. In the meantime as the result of State construction of roads, the tax rate was increasing and had jumped from 17 to 31 cents. In conclusion the speaker said: "The toll gate may have the last laugh; like Banquo's ghost, it may return at the command of infuriated taxpayers as a matter of self-preservation and escape from an intolerable tax rate. This language may sound like the voice of a reactionary speaking, but, be that as it may, if any progressive has a better method of meeting the conditions which confront us let him come to the front and propound it."

Thomas A. Murray of Baltimore City favorably commented upon the

paper of Mr. Strite and stated that he thought the way the State roads are being built is extravagant and not in accordance with the most practical methods. Upon his motion a rising vote of thanks was given Mr. Strite, and it was asked that his remarks be given the widest publicity.

Engineers' Society of Western Pennsylvania.

Morris Knowles, president of the Water Utilization Association of Pennsylvania, read an exhaustive and instructive paper on "Public Utility Regulation and Its Relation to Water Conservation" before the society December 19, in which he declared that the subject is among the most important confronting the state and nation, and to Pittsburg particularly, because of the local traction situation and the subway problem on the one hand and the flood losses and water supply on the other. He also declared that a discussion of the subject is ripe because of the near approach of the session of the newly elected legislature, dominated by new political forces and pledged to legislation on both issues.

Mr. Knowles said that water companies are public utilities and public utilities are water users, and said that the relation is so close that administrative separation may be impossible. He also said that no system of regulation can succeed without taking into account the problem of water conservation, and that no plan of water conservation can be successfully carried out unless provision is made for adequate public utility regulation. He declared that laws on both subjects are inadequate; that there is no regulation except by municipal ordinances, the courts and a non-powerful railroad commission in a limited field; that the health authorities are helpless because of the inconsistency of the laws in respect to the pollution of streams.

Speaking of new legislation needed, Mr. Knowles said: "The commission should be appointive and be invested with wide power and conspicuous responsibilities. Its jurisdiction should be over all utilities, whether publicly or privately owned or operated. Its power should extend over the issue of securities, rates, accounting, service, safety and with full publicity. The Constitution must be amended before state funds for water conservation can be used, and water companies for public use should have right of eminent domain, subject to the state commission."

A letter was read from Col. T. P. Roberts in which he objected to the Flood Commission's recommendation regarding storage reservoirs, stating that only one was recommended for the Youghiogheny River, and that in the state of Maryland. He urged the building of a hundred small reservoirs within short distances of Pittsburg at a cost of not more than \$125,000 each; but advocated the raising of more streets in the city in preference to the building of any dams.

O. C. Merrell, chief engineer of the State Forest Commission, said there are but two reasons for public control of the water supply—adequate service and reasonable price to the consumer.

Illinois Association of Municipal Contractors.

The association has published in pamphlet form an address on the objects and purposes of the association, delivered by P. F. McCarthy, Davenport, Ia., at the fourth annual convention, Chicago, February 20, 1911. The officers of the association are: A. E. Rutledge, president; I. D. Lain, secretary, and C. E. Mather, executive secretary. An office is maintained in the Strauss Building, Chicago. The principal objects, as stated in the address, are: To promote public improvements; to secure a higher degree of accuracy in the legally prescribed procedure and proceedings; to collectively bear the expense incident to the making of abstracts of legal proceedings and the examination thereof; to stimulate the market and the demand for approved improvement bonds and protect the contractors against unwarranted exactions and unreasonable discounts; to bring to bear influence and information so that such securities will be stable; to improve the quality, quantity and efficiency of public improvements; to eliminate from specification clauses which work a hardship to the contractor.

PERSONALS

Bauer, Jacob L., Elizabeth, N. J., will be reappointed County Engineer for a term of five years.

Merrit, James S., Port Chester, N. Y., who has been a member of the Port Chester Fire Department for twenty-five years, has been elected Chief of the Fire Department.

The following mayors have been elected:

Massachusetts.

Beverly.....Herman A. MacDonald
Chelsea.....Edward E. Willard
Chicopee.....Frank A. Rivers
Everett.....James Chambers
Lynn.....George H. Newhall
Malden.....George L. Farrell
Melrose.....Oliver B. Munroe
Newburyport.....Hiram A. Landford
North Adams.....Wallace E. Brown
Salem.....John F. Hurley
Woburn.....William H. Henchey
Worcester.....George M. Wright

Oregon.

La Grande.....Dr. M. K. Hall
California.

San Diego.....Manuel Labistide
Washington.

Kennewick.....S. M. Lockerby
Florida.

Mayo.....Hal. W. Adams
Texas.

Ennis.....T. H. Floyd
New Boston.....O. B. Pirkey
Tennessee.

Morristown.....E. M. Grant

MUNICIPAL APPLIANCES

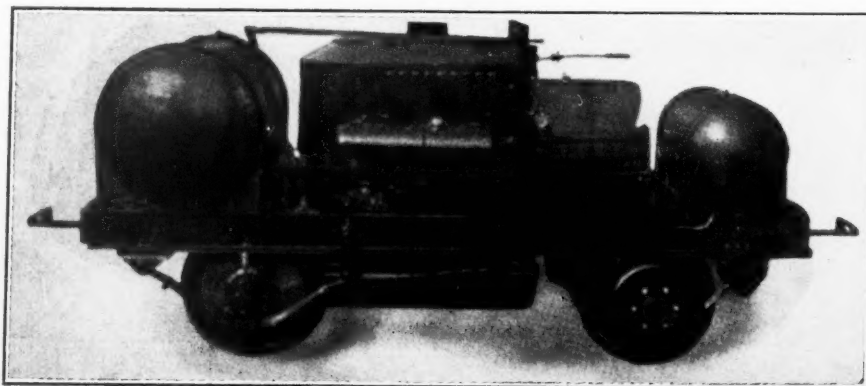
Contractor's Light Oil-Burning Locomotive.

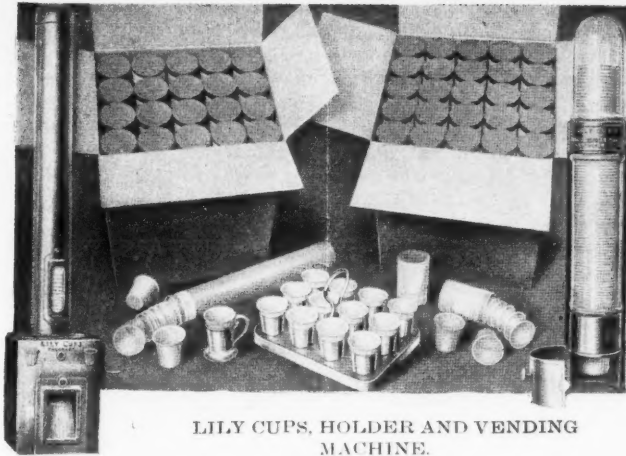
H. W. Bell & Company, 36 Morning-side avenue, Yonkers, N. Y., manufacture steam trucks and light oil-burning contractor's locomotives. These machines are particularly adapted for jobs where larger locomotives cannot be used to advantage and where mules are now employed, or on short jobs that do not warrant the expense of installing and transporting a regular dinkey. They can also be used on fills to great advantage and effect a saving in the track and trestle construction necessary.

The latest model made by the Bell Company, a 5,000-pound dinkey, are as follows:

Wheel base, 5 feet; wheels, 20-in.

diameter, 3½-in. face; axles, 3 3-16 inches; length overall, 9 feet; engine, 2-cylinder, high-pressure, double-acting, of reg. locomotive type; cylinder 4½ in. x 6½ in., cranks run in oil bath. Boiler, vertical fire tube type, 26 in. diam. with 156 sq. ft. heating surface, shell is wound with piano wire; the upper head, shell and ring are welded together by the oxy-acetylene process; the tubes are of copper reinforced at each end with steel bushings; tested to 1,200 lbs., working pressure 500 lbs. Draw-bar pull, not figuring slippage, 4431 lbs.; speed, maximum, with load 15 to 20 miles per hour, depending on track conditions; burner, gasoline or kerosene, as ordered; fuel cost per mile with load, approximately four cents.





LILY CUPS, HOLDER AND VENDING MACHINE.

Paper Drinking Cup.

The Public Service Cup Company, Bush Terminal Building, Brooklyn, N. Y., manufactures a paper drinking cup and devices for handling it, as shown in the illustration. The cup is placed on the market under the trade name, "Lily Cup." It is a specially designed drinking cup, claimed to be different from any other hitherto placed on the market. It is made in one piece and stiffened by folds that act like structural braces. It holds its shape while in use. The cups are made entirely by machinery, without any hand-lining. They are sterilized and placed in air-tight cartons. Hence they fulfil the strictest sanitary requirements. The company makes vending machines, by which the cups may be sold in public places and trays for passing them around in theatres.

The Detectorphone.

The Boston Talking Machine Co., 41 West street, Boston, Mass., manufacture the Detectorphone, an electrical instrument which employs the principle of the microphone for the detection of mechanical trouble. A more descriptive name for this instrument is "mechanical stethoscope."

It consists of a sensitive microphone and a 6-in. dry cell enclosed in a metal cylinder, a high resistance telephone head-receiver with flexible connecting cord and two metal rods, one of which is straight and the other curved at right angles, as shown in the accompanying cut. The microphone, battery and receiver are connected in series, the circuit being closed by means of a push button on the battery cylinder. The metal rod is screwed tightly into the front of the instrument through a bushing and engages with the diaphragm of the microphone. The battery can be removed if necessary by giving the metal cap, which constitutes the base, a half turn, then pulling out.

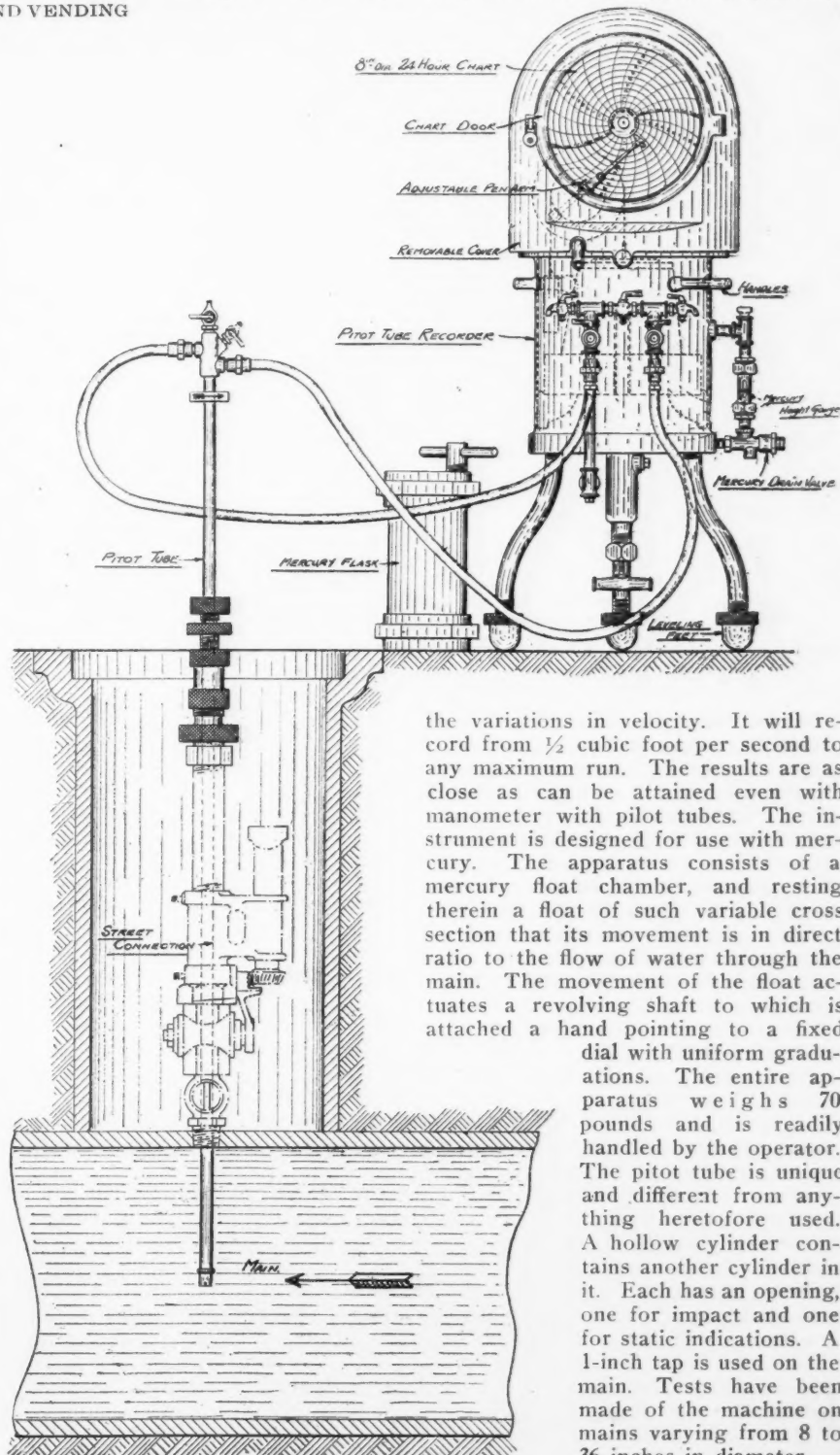
In service, the metal rod is pressed against the part to be tested as for instance, a motor or engine bearing, a pump, or a waterpipe, etc.; the head receiver is held tightly against the ear and the push button is pressed down to close the electric circuit. The vibration of the machine being tested is

transmitted to the receiver and there made audible by a slight humming or buzzing sound. The slightest irregularity of operation which may be inaudible to the unaided ear, can thus be instantly detected by the humming noise produced in the receiver. It is first necessary to make tests of the

sounds made by the machinery while in perfect running condition. The irregular sounds then produced by defects in the operation of a machine can after short practice be readily analyzed, thus preventing what might have been a serious and costly shut down.

Portable Simplex Meter Register.

The Simplex Valve and Meter Co., 112 North Broad street, Philadelphia, Pa., have placed on the market a portable Simplex pitot recorder for use in registering the flow of water in mains of any size. It registers on a chart similar to the well known Bristol chart



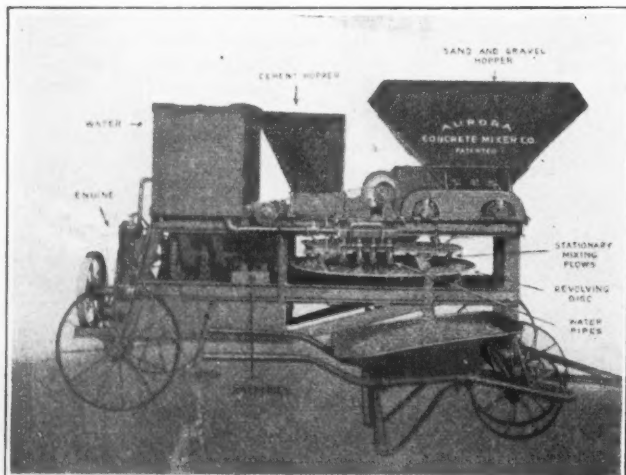
the variations in velocity. It will record from $\frac{1}{2}$ cubic foot per second to any maximum run. The results are as close as can be attained even with manometer with pitot tubes. The instrument is designed for use with mercury. The apparatus consists of a mercury float chamber, and resting therein a float of such variable cross section that its movement is in direct ratio to the flow of water through the main. The movement of the float actuates a revolving shaft to which is attached a hand pointing to a fixed dial with uniform graduations. The entire apparatus weighs 70 pounds and is readily handled by the operator. The pitot tube is unique and different from anything heretofore used. A hollow cylinder contains another cylinder in it. Each has an opening, one for impact and one for static indications. A 1-inch tap is used on the main. Tests have been made of the machine on mains varying from 8 to 36 inches in diameter.

Aurora Concrete Mixer.

The Aurora Concrete Mixer Company, Ridgeway and Woodlawn avenue, Aurora, Ill., have placed on the market a small capacity mixer, 6 cubic yards per hour, which employs an original device for mixing. The mixer is a circular pan revolving horizontally, into which the ingredients are delivered at the center and move toward the edge by centrifugal force, being mixed and turned over by ten plows before they are discharged from the chute.

The machine is a continuous mixer, weighing 1,500 pounds. The frame is of steel, the wheels are 19 and 24 inches in diameter, the wheelbase 6 feet. Power is supplied by a gasoline engine of 3 horse-power, entirely enclosed. On top of the frame forward are hoppers for cement, sand and gravel. The materials are measured automatically and dropped into the mixing pan. The proportions are adjusted by the use of sprocket wheels of different diameters.

A study of the illustration of the mixing pan shows why no concrete can be delivered without a thorough mixing. Sand and gravel are delivered to the center of the pan from one hopper. A definite proportion of cement is delivered from the other hopper onto the sand and gravel. The ratio of cement to the sand and gravel is mechanically adjusted and cannot vary except as the adjustment is changed by the operator. As the pan continues to revolve, it brings the dry material against plow No. 1, which turns the stream over. Plow No. 2 meets the stream of material in the center and again turns it over, one-half going to either side. The mixture thus continues to gradually work outwards, being mixed and turned over and over by the ten plows and blades and discharged at one point in a continuous stream. Water is added from four pipes to the dry mixture about half way from the edge of the pan so that concrete is first thoroughly mixed dry and then wet. Whether the machine is running light or full capacity, not a particle can be discharged without being turned at least twenty times, and the large stones must take exactly the same course around the pan as the finest grains of sand.

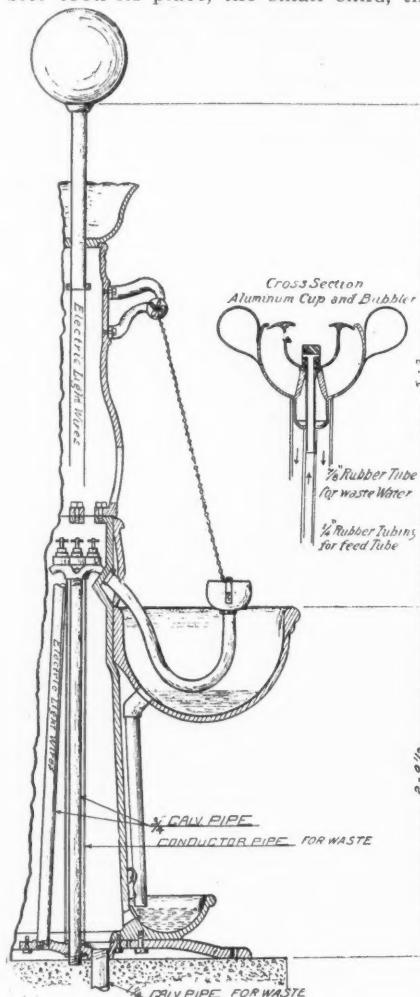


AURORA CONCRETE MIXER.

Lansing Sanitary Drinking Fountain.

The Gier & Dahl Mfg. Co., Mich., manufacture a sanitary drinking fountain for which two essential features are claimed as exclusive merits,—first, ease in drinking; second, beauty and attractiveness of appearance. The public drinking cup has been rightly condemned, but when the low type bubbler took its place, the small child, the

everyone to drink with equal ease. The bubbler is raised to the height of the lips, while with all other fountains the lips must be brought to the position of the bubbler. "The Lansing" enables every one to drink in a perfectly easy and natural position, just as easy as the old tin cup and chain, yet with positively every sanitary advantage.



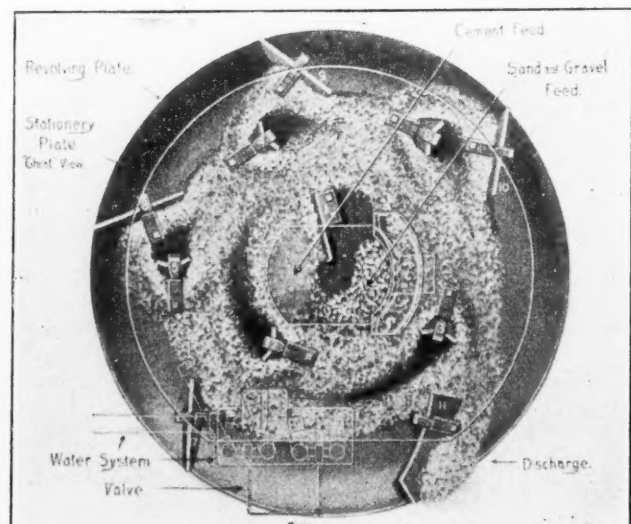
CROSS SECTION OF THE LANSING.

woman, the tall and the fat man found they had no place to drink. To the child it is impossible, to the woman it is disgraceful, to the tall man awkward, and to the fat man—well, it can't be done. "The Lansing" permits



LANSING SANITARY DRINKING FOUNTAIN.

Briefly described, the principal feature of the fountain is in the hose and cup arrangement, which consists of a double tube, the inner tube being the feed pipe for the bubbler, the outer tube acting as a waste pipe for carrying away the surplus water while the



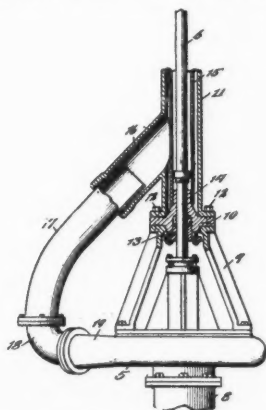
AURORA MIXING PAN.

person is drinking. The flow of water through the inner tube is continuous, no matter what the position of the cup. When the cup is lowered the waste water flows over the edge of the cup (keeping it sanitary) into the large bowl. When the cup is raised, this waste water flows through the outer tube, directly into the drain. This dual system of carrying away the water avoids any dripping or splashing and keeps the cup absolutely sanitary at all times. The dog trough at the bottom is fed from the overflow of the large bowl. "The Lansing" is truly an ornament to any city street or park.

PATENT CLAIMS

1,047,258. PUMPING APPARATUS. Fred J. Lukins, Artesia, N. Mex. Serial No. 671,709.

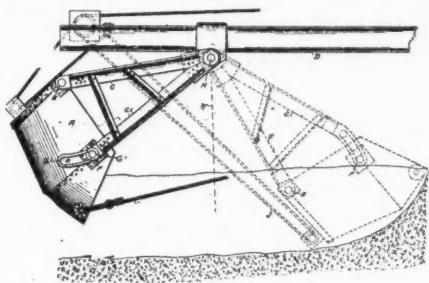
In a pump, the combination of a pump-shaft, centrifugal pumping mechanism operated thereby, a discharge pipe surrounding



the pump-shaft above the pumping mechanism and closed at its lower end, and means connecting the discharge of the centrifugal pumping mechanism with said discharge pipe.

1,047,135. EXCAVATING DIPPER. Albert E. Park, Minneapolis, Minn. Filed Jan. 27, 1912. Serial No. 673,768.

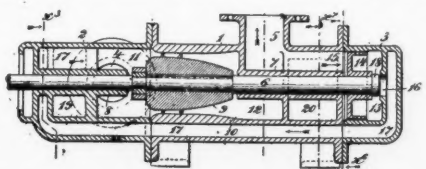
The combination, with a boom, of arms pivoted thereon, and a dipper having its rear



portion pivotally connected with said arms and its forward portion slidably connected with said arms.

1,047,261. SCREW - PROPELLER PUMP. Franz Marburg, Jr., New York, N. Y. Serial No. 174,249.

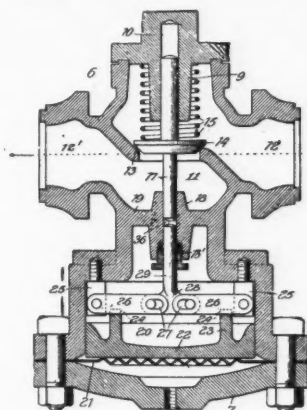
A screw pump, having a casing, with a fluid inlet and fluid outlet, a screw wheel having a substantially spiral blade, the outer contour of the main portion of said blade being



substantially cylindrical, corresponding to the inner wall of the casing and said screw wheel being fitted in and mounted rotatively within said casing, the casing increasing gradually in diameter internally beyond the screw outlet, to form a gradually enlarging annular chamber, into which the fluid flows from the screw.

1,047,506. AUTOMATIC PRESSURECONTROLLING VALVE DEVICE. James W. Dawson, Chicago, Ill. Serial No. 704,388.

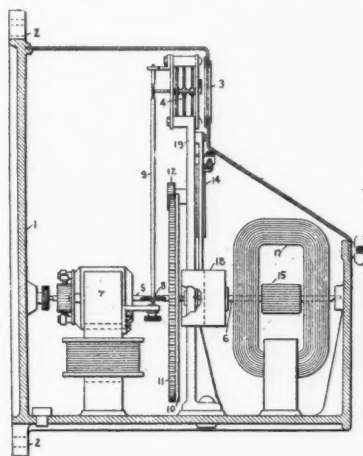
In an automatic valve-device of the character described, the combination of a casing having a pressure-fluid passage with an inlet and an outlet, a self-closing valve seating in said passage, a chamber in the casing communicating with the pressure-fluid-supply, a diaphragm in said chamber and a solid re-



acting head fitting therein and bearing against and covering substantially the entire effective surface of the diaphragm and having limited movement, and lever-mechanism in said chamber interposed between the valve and piston to be actuated by the diaphragm to increase by its movement that of the valve for unseating it.

1,046,750. ELECTRIC METER. Justus B. Entz, Cleveland, Ohio, assignor to General Electric Company, a Corporation of New York. Serial No. 550,023.

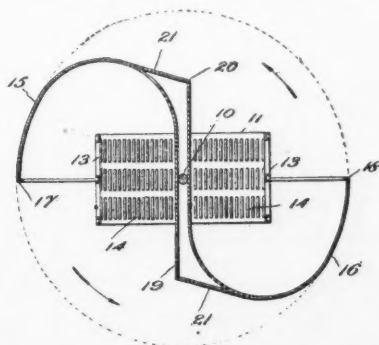
In an electric meter, the combination of a registering mechanism, a driving motor op-



erating said mechanism, a brake, magnetic means applying the brake to the motor, and a dynamometer releasing said brake.

1,047,734. ROTARY DRIER. Seymour W. Bonsall, New York, N. Y. Serial No. 684,905.

A drier comprising a rotably mount container and an intake scoop extending from the



retreating opening of said container and bending around the same in a forward direction so as to present an advancing opening when the container is revolved, substantially as described.

INDUSTRIAL NEWS

Cast Iron Pipe.—A number of small but no large orders have been booked. Quotations: 4-inch, \$31; 6 to 12-inch, \$29; 16-inch and up, \$28. Birmingham —While few orders have been received lately, shipments are equal to output. Quotations: 4-inch, \$22.50; 6-inch and up, \$22.50. New York—Private buying is fair. Quotations. 6-inch, \$25 to \$27.

Lead.—Prices are lower. St. Louis, 4.125c.; New York, 4.275c.

Cement Reorganization.—Reorganization of the American Cement Company, which went into the hands of a receiver last February, has been assured by the number of stockholders who have sent their securities to Charles J. Rhoads, chairman of the reorganization committee. All of these have agreed to the plan of the committee made public last November. The committee will hold a meeting in a few weeks, and it is expected that announcement will be made at that time that the plan will be put into effect immediately. During the receivership the company has been doing business in the Pennsylvania building, Philadelphia. After the reorganization it will continue in business at the same place.

La France Reorganization.—At a recent meeting in Elmira, N. Y., the American La France Fire Engine Company was reorganized. About a year ago it was apparent to the directors that the present capitalization was not sufficient to provide for the growth of the business created by the general adoption of motor traction for fire apparatus. As a result of the action of the directors, old securities will be retired and new ones issued. The company will receive about \$600,000 available as working capital. The new company will be known as the American La France Fire Engine Company, Inc.

Metal Culverts.—Garner E. Dalton has been made president and A. H. Fairleigh superintendent of the Kentucky Metal Products Company, Louisville, which will manufacture a patented metal culvert. The company is licensed by the United States Sheet and Metal Culvert Company, Birmingham, Ala. It has arranged for the manufacture of its product on the property of Stratton & Terstegge, Louisville stove founders and tinware manufacturers, but will buy special equipment for the work. Electric welding apparatus will be included in the requirements of the company, which expects to begin manufacturing within six weeks.

Motors.—The Wagner Electric Company, St. Louis, has awarded a contract for an addition to its power plant to cost, with new equipment, about \$30,000.

THE WEEK'S CONTRACT NEWS

Relating to Municipal and Public Work—Street Improvements—Paving, Road Making, Cleaning and Sprinkling—Sewerage, Water Supply and Public Lighting—Fire Equipment and Supplies—Bridges and Concrete Work—Sanitation, Garbage and Waste Disposal—Police, Parks and Miscellaneous—Proposals and Awards.

To be of value this matter must be printed in the number immediately following its receipt, which makes it impossible for us to verify it all. Our sources of information are believed to be reliable, but we cannot guarantee the correctness of all items. Parties in charge of proposed work are requested to send us information concerning it as early as possible; also correction of any errors discovered.

BIDS ASKED FOR

STATE	CITY	REC'D UNTIL	NATURE OF WORK	ADDRESS INQUIRIES TO
STREETS AND ROADS				
Ohio	Cleveland	Jan. 4, 11 a.m.	Imp. County road	J. F. Goldenbogen, Clerk.
Pennsylvania	Dubois	Jan. 4, 9 a.m.	Grading 4 miles road, &c.	George Beer, Supervisor.
New Jersey	Ocean City	Jan. 4, 1 p.m.	Constrn. 4,600 ft. roadway	O. C. Auto Bridge Co.
California	Burbank	Jan. 4, 7 p.m.	Oiling and tamping 1 mile road	F. E. Craig, City Clerk.
New York	Syracuse	Jan. 4, 1 p.m.	Constrn. 17 miles county roads	F. E. Borgardus, Supt. H'ways.
Ohio	Newton Falls	Jan. 4, 1 p.m.	Grading and macadamizing 2 roads	A. E. Butts, Trustee.
Indiana	Shelburn	Jan. 6	Constrn. 7,000 sq. yds. pavement	Town Board.
Indiana	Connorsville	Jan. 6, 2 p.m.	Constrn. gravel road	J. L. Kennedy, Co. Aud.
Indiana	Delhi	Jan. 6, noon	Improving highways	M. G. Haun, Co. Aud.
Indiana	Jeffersonville	Jan. 6, 10 a.m.	Constrn. gravel road	G. W. Stoner, Co. Aud.
Indiana	Franklin	Jan. 6, 10 a.m.	Constrn. gravel road	H. L. Knox, Co. Aud.
Indiana	Brownstown	Jan. 6, 1:30 p.m.	Constrn. gravel road	H. W. Wacker, Co. Aud.
Indiana	Rensselaer	Jan. 6, 3 p.m.	Constrn. macadam roads	J. P. Hammond, Co. Aud.
Indiana	Salem	Jan. 6, 1:30 p.m.	Constrn. a number of roads	F. S. Munkelt, Co. Aud.
Alabama	Grove Hill	Jan. 6, 2 p.m.	Constrn. sand clay roads	County Comrs.
New Jersey	Jersey City	Jan. 6, 2 p.m.	Repairing and improving a number of streets	E. B. Sec, Clk.
Indiana	Marion	Jan. 7, 2 p.m.	Constrn. gravel and stone roads	E. H. Kimball, Co. Aud.
Indiana	Logansport	Jan. 7, 10 a.m.	Constrn. 2 roads	J. E. Wallace, Co. Aud.
Indiana	Petersburg	Jan. 7	Constrn. gravel roads	J. D. Gray, Aud.
Florida	Clearwater	Jan. 7, 7:30 p.m.	Constrn. concrete sidewalk	R. T. Daniel, Town Clerk.
Indiana	Corydon	Jan. 7, 2 p.m.	Constrn. 2 gravel roads	Wm. Taylor, Co. Aud.
Indiana	Vincennes	Jan. 7, 2 p.m.	Constrn. 13,200 ft. gravel road	J. T. Scott, Co. Aud.
Indiana	Rockville	Jan. 7, 1:30 p.m.	Constrn. gravel roads	J. E. Elder, Co. Aud.
Minnesota	Mora	Jan. 7, 10 a.m.	Constrn. gravel road	Anton Peterson, Co. Aud.
California	Santa Monica	Jan. 7, 5 p.m.	Grading boulevard	E. A. Mosse, Clerk.
Michigan	Detroit	Jan. 7	Furn. 1,000,000 paving brick	J. J. Haarer, Comr. Pub. Wks.
Texas	Beaumont	Jan. 7	Constrn. pavement on Washington st.	E. A. Fletcher, Mayor.
Indiana	Portland	Jan. 7, 10 a.m.	Improving highway	J. Bonifas, Co. Aud.
New York	Brooklyn	Jan. 8, 11 a.m.	Constrn. asphalt pavements	A. E. Steers, Boro. Pres.
Indiana	Muncie	Jan. 8, 10 a.m.	Constrn. macadam	F. M. Williams, Co. Aud.
Indiana	Lafayette	Jan. 8, 10 a.m.	Constrn. gravel roads	G. W. Baxter, Co. Aud.
Kansas	Manhattan	Jan. 8	Constrn. rock road	G. H. Hungerford, Co. Clerk.
Illinois	Charleston	Jan. 8, 2 p.m.	Constrn. 3,422 ft. gravel road	A. O. Huckaba, Comr. H'ways.
Pennsylvania	Wilkes-Barre	Jan. 9, 10 a.m.	Improving county road	County Comrs.
Ohio	Bryan	Jan. 9, noon	Constrn. asphalt blk. sheet asphalt, vit. brick or bituminous concrete pavement.	J. A. Neill, Village Clerk.
Pennsylvania	Pittsburg	Jan. 10	Constrn. stone pavements	J. G. Armstrong, Dir. Pub. Wks.
Arizona	Phoenix	Jan. 13	Constrn. 24,000 bitulithic pavement	Frank Thomas, Recorder.
So. Carolina	Spartanburg	Jan. 13	Constrn. sts. and sidewalks, cost \$90,000.	J. H. Shores, Supt.
Iowa	Clinton	Jan. 14, 8 p.m.	Constrn. 36,800 yds. concrete or brick	C. J. Reusche, Co. Clerk.
Ohio	Cleveland	Jan. 15, 11 a.m.	Improving road	J. F. Goldenbogen, Clerk.
New York	Fort Totten	Jan. 15, 2 p.m.	Constrn. macadam roads & cement walks.	Quartermaster.
Ohio	Cincinnati	Jan. 17, noon	Improving road	Co. Comrs.
Michigan	Manistique	Feb. 6, 2 p.m.	Constrn. 2 3/4 miles road	County Clerk.
SEWERAGE				
Indiana	Jeffersonville	Jan. 4	Constrn. sanitary sewers	E. W. Rauth, City Clerk.
California	Los Angeles	Jan. 6	Constrn. concrete pipe and brick sewer, cost \$540,000	Board of Pub. Works.
Ohio	Bremen	Jan. 6, noon	Constrn. sewers	E. T. Purvis, Village Clerk.
Iowa	Manning	Jan. 6, 5 p.m.	Constrn. sanitary sewer	Martin Brunnier, Town Clerk.
California	Bakersfield	Jan. 6	Constrn. main and outfall sewer system, cost \$200,000	C. B. Greely, City Engr.
New York	Tuckahoe	Jan. 6, 8 p.m.	Furn. 90,000 ft. vitrified pipe sewer, cost \$200,000	R. J. Bellow, Sewer Com.
No. Carolina	Newberne	Jan. 7, 8 p.m.	Constrn. 4,000 ft. 6 to 24-in. pipe sewers	R. R. Eagle, City Engr.
Pennsylvania	New Kensington	Jan. 7, 7:30 p.m.	Constrn. sanitary sewers	O. B. Higley, Boro. Engr.
Missouri	St. Louis	Jan. 7, noon	Constrn. sewer	Bd. Pub. Imps.
New York	Brooklyn	Jan. 8, 11 a.m.	Constrn. a number of sewers	A. E. Steers, Boro. Pres.
Indiana	Lebanon	Jan. 13, 7:30 p.m.	Constrn. sewer	Edmund Connor, City Clerk.
Texas	Houston	Jan. 13, noon	Constrn. 104,000 ft. 5 1/2 to 10 ft. sewers, &c.	H. B. Rice, Mayor.
No. Carolina	Wilmington	Jan. 14	Constrn. 36 miles 2 to 24-in. sewers	W. E. Perdew, Chrmn. Com.
Kansas	Yates	Jan. 14	Constrn. clay pipe sewers, cost \$80,000	L. R. Wallace, City Clerk.
Mass.	Boston	Jan. 14	Constrn. automatic elec. pump. station	L. K. Rourke, Comr. Pub. W.
New York	New York	Jan. 15	Constrn. sewers in 4 sts.	C. C. Miller, Boro. Pres.
Florida	Arcadia	Jan. 15, noon	Constrn. sewerage system	Br. Bond Trustees.
New York	Larchmont	Jan. 15, 8:30 p.m.	Constrn. sewer	L. E. Van Etten, New Rochelle.
California	Dinuba	Jan. 15	Constrn. sewer system, cost \$42,000	R. Morton, City Clerk.
Iowa	Tipton	Jan. 15	Constrn. sewers	P. D. Ketelsen, City Clerk.
Spain	Madrid	Jan. 15	Constrn. sewers	No. 9911 Bureau Mfgs., Washington, D. C.
Mass.	New Bedford	Jan. 18	Constrn. concrete substructure for screen station	W. F. Williams, City Engr.
Canada	Edmonton, Alta.	Jan. 18	Constrn. trunk sewer	City Comrs.
Ohio	Cleveland	Jan. 20, noon	Constrn. sewers in number of sts. at Shaker Heights	C. A. Palmer, Vil. Clerk.
Missouri	Richmond	Jan. 25	Constrn. clay pipe sewers, cost \$20,000	Chas. Brown, City Clerk.
New Jersey	Newark	Feb. 4	Constrn. Sec. No. 7 Passaic Valley sewer	Passaic Val. Sewerage Com.
WATER SUPPLY				
Canada	Kerrisdale	Jan. 6, 5 p.m.	Furn. valves, special castings & hydrants.	C. H. Heighway, City Clerk.
Arkansas	Gravette	Jan. 6, 10 a.m.	Constrn. water works and light. system	J. F. Dorsett, Sec. Com.; Nagel & Petersen, Muskogee, Okla.
New Jersey	Jersey City	Jan. 6, 2 p.m.	Removing reservoir walls from Reservoir No. 3	E. B. Sec, Clk.

BIDS ASKED FOR

STATE	CITY	REC'D UNTIL	NATURE OF WORK	ADDRESS INQUIRIES TO
Michigan	Kalamazoo	Jan. 6, 5 p.m.	Furn. 500 tons c-i pipe	C. L. Miller, City Clerk.
Minnesota	St. Paul	Jan. 6, 2 p.m.	Constrn. water tank and tower	Park Comrs.
New York	New York	Jan. 8, 2 p.m.	Constrn. Jerome Park filters, including 800,000 cu. yds. excavation, 300,000 cu. yds. concrete and filtering apparatus...	H. S. Thompson, Comr. W. Sup. Board of Contract.
New York	Schenectady	Jan. 8	Furn. 850 meters	W. S. Ruff, Dir. Pub. Ser. City Council.
Ohio	Canton	Jan. 8, noon	Constrn. 10 6-in wells and furn. 1,030 ft. wrought iron pipe	A. J. Smith, Emporia, Engr.
Kansas	Burlingame	Jan. 9	Constrn. water works, cost \$56,000	A. S. Waterman, Town Clerk.
California	Tehachapi	Jan. 13	Constrn. water works, cost \$14,000	C. F. Sturtevant, Engr., Holdredge, Neb.
Nebraska	Doniphan	Jan. 15	Installing water system, cost \$18,000	B. A. Beschler, City Clerk.
In Iana	Richmond	Jan. 16, 10 a.m.	Furn. water for 25 years	C. A. Palmer, Vil. Clerk.
Ohio	Cleveland	Jan. 20, noon	Constrn. 6-in. water mains at Shaker Heights	Pub. Works Com.
So. Carolina	Rockhill	Jan. 21, 3 p.m.	Constrn. pumping station, filter plant, reservoir, 5 miles pipe line, &c	J. M. Bassett, Chief Engr.
Texas	Dallas	Jan. 30	Constrn. pumping station	
LIGHTING AND POWER				
Pennsylvania	Canonsburg	Jan. 6	Installing electric work in school	Bd. of Directors.
Florida	Jacksonville	Jan. 6	Furn. 1,200 single conductor cable term's.	W. M. Bostwick, Jr., Ch. Bd.
Pennsylvania	Tarentum	Jan. 6, 8 p.m.	Constrn. chimney at electric light plant	W. A. Gibson, Boro. Sec.
Dist. Colum.	Washington	Jan. 7, 10 a.m.	Constrn. elec. travel. cranes, Sched. 5054	Navy Dept.
Mississippi	Oxford	Jan. 8, 7 p.m.	Furn. engine and generator	W. L. Smith, City Clerk.
New Jersey	Newark	Jan. 9, 4.30 p.m.	Furn. 66-in. by 18-ft. H. T. return tubular boiler	J. C. Dana, Sec. Trustees Free Pub. Lib.
Washington	Seattle	Jan. 10, 10 a.m.	Furnishing switchboard panels, three, 500 K.W. motor generator sets, poles, etc., for municipal street railway	C. B. Bakley, Sec. Bd. Pub. Wks.
Texas	Nacogdoches	Jan. 15	Constrn. elec. light plant, cost \$20,000	S. R. McKinney, Sec.
Kansas	Kingman	Jan. 25	Furnishing electric light; cost, \$25,000	Worlev & Black, Engrs., Reliance Bldg., Kansas City, Mo.
Florida	St. Petersburg	Feb. 6	Purchas. gas franchise	W. F. Divine, City Clerk.
Louisiana	New Orleans	Feb. 18, noon	Constrn. transmission line and power cables for drainage system	F. S. Shields, Sec.
Chile	Santiago	Sept. 10	Constrn. illuminating plant for port wks.	Comision de Puertos.
FIRE EQUIPMENT				
Pennsylvania	Catasauqua	Jan. 6, 7 p.m.	Furn. 500 to 1,000 ft. fire hose	Wm. Samuels, Sec. F. & W. Com.
New York	Buffalo	Jan. 6, 9 a.m.	Furn. 5,000 ft. 2½-in. fire hose	S. Siebert, Comr.
Dist. Colum.	Washington	Jan. 7, 10 a.m.	Furn. rubber fire hose	Navy Dept.
New York	Buffalo	Jan. 13, 9 a.m.	Furn. 2 motor comb. engines & hose wagons, 1 85-ft. motor aerial truck	S. Siebert, Comr.
California	Selma	Jan. 20	Furn. motor comb. wagon	City Clk.
Kansas	Fort Scott	Jan. 21, 5 p.m.	Furn. 500 ft. 2½-in. fire hose	G. N. Sanford, City Clerk.
BRIDGES				
New Jersey	Ocean City	Jan. 4	Constrn. bridge	Ocean City Bridge Co.
Alabama	Birmingham	Jan. 6	Constrn. concrete viaduct	E. M. Durham, Engr. Birm'ham.
Nebraska	York	Jan. 7	Constrn. bridges during 1913	County Comrs.
Mississippi	Macon	Jan. 7	Constrn. concrete bridge	J. A. Tyson, City Clerk.
Kansas	Council Grove	Jan. 8	Constrn. bridge	County Comrs.
Indiana	Albion	Jan. 8, 10 a.m.	Constrn. concrete arch bridge	J. C. Kimmell, Co. Aud.
Indiana	Ligonier	Jan. 8	Constrn. 90-ft. concrete bridge	J. C. Kimmell, Co. Aud.
Canada	Vancouver	Jan. 13	Constrn. bridge, cost \$400,000	City Council.
New Jersey	New Brunswick	Jan. 13, 2 p.m.	Constrn. concrete bridge	P. H. S. Hendricks, Dir.
Indiana	Indianapolis	Jan. 14, 10 a.m.	Constrn. reinforced concrete bridge	Bd. Comrs.
Nebraska	McCook	Jan. 15, noon	Constrn. bridges during 1913	C. K. Dutcher, Co. Clerk.
California	Yosemite	Feb. 1, 2 p.m.	Constrn. 4 concrete bridges	Lt. Col. W. W. Forsyth.
MISCELLANEOUS				
Florida	Bushnell	Jan. 6, noon	Constrn. County Courthouse and Jail	E. V. Mann, Clk. & Aud.
California	Huntington Beach	Jan. 6	Constrn. reinforced concrete pier	C. B. Levering, City Clerk.
Pennsylvania	Tarentum	Jan. 6, 8 p.m.	Constrn. chimney for lighting plant	W. A. Gibson, Boro. Sec.
Colorado	Denver	Jan. 6	Furn. 210,000 bbls. Portland cement	U. S. Reclamation Service.
Texas	Beaumont	Jan. 7	Constrn. municipal abattoir	E. A. Fletcher, Mayor
Illinois	Chicago	Jan. 8, 1 p.m.	Constrn. shelter house and comfort sta.	Perkins, Fellows & Hamilton, Archts., suite 1,100, N. Clark st.
Mississippi	Dekalb	Jan. 9	Constrn. court house	County Comrs.
Connecticut	Hartford	Jan. 14, noon	Constrn. extension to Municipal Bldg.	Board Contract.
Pennsylvania	Washington	Jan. 20	Constrn. 20-ton incinerating plant	John Griffiths, Boro. Pres.

STREETS AND ROADS

Los Angeles, Cal.—Recommendation has been made by City Council's Street and Boulevard Committee to have assessment district created for purchase of land necessary for proposed Arroyo Seco parkway. It was also decided to recommend that Griffin ave. be opened and widened under general street improvement proceedings from Ave. Twenty-eight easterly to Pasadena line.

Pasadena, Cal.—Council has approved petition for opening of Holly st. through from Delacy to Worcester. Street is to be 50 ft. wide and additional ground needed to widen it will be taken from north side of street.

Sacramento, Cal.—Last lap of state highway between Sacramento and Los Angeles, has been determined by highway commission, following conference with Governor Johnson and advisory board of state engineering department, when Tejon Pass route between Bakersfield and Los Angeles was selected.

Sacramento, Cal.—State highway commission has approved survey for 130 miles of road to run from San Diego to El Centro, county seat of Imperial, by

way of La Mesa, El Cajon, Bostonia, Descanso and Campo.

San Bernardino, Cal.—System of good roads is being discussed.

Colorado Springs, Col.—Chambers of Commerce of Colorado Springs, Pueblo, Denver and other cities have written in petition to coming session of Legislature to give State Highway Commission \$1,000,000 now in treasury for purpose of improving State roads.

Denver, Col.—C. P. Allen, chairman, Thomas Tully and J. E. Maloney, of State Highway Commission, have completed plans for improvement of 4,519 miles, the entire system of State primary roads, at total cost of \$1,832,500.

Fort Collins, Col.—County Commissioners have accepted proposal of Estes Park to-day to make road from Deep Mountain to Grand Lake county road. Road will be 21 miles in length, half of it being within county and other half in National Park. County has not agreed to build new road, but simply accepts it so that Estes Park and Loveland citizens may request State Highway Commission to make it primary road. It will not interfere with proposed Poudre River road.

Anacostia, D. C.—The Anacostia Citizens' Association has forwarded request to Commissioners for granolithic sidewalk and curbing on both sides of U st., between 13th and 15th st., and pleads for early action.

Washington, D. C.—That there be constructed around Crater Lake road which will be one of great scenic highways of world is recommendations contained in annual report of superintendent of Crater National Park, in Oregon, which has just been made public by Department of Interior.

Atlanta, Ga.—North Boulevard will be repaved with bitulithic.

Chicago, Ill.—West Madison st., between Market and Clinton sts., is to become beautiful and inspiring thoroughfare when plan under consideration by trustees of the Art Institute and Lawrence E. McGann, Commissioner of Public Works, attains maturity.

Corning, Ia.—Resolution has been passed for extensive paving and curbing. Preliminary estimate shows: 22,469 sq. yds. street paving, 845 sq. yds. concrete alley paving, 16,127 lin. ft. combined curb and gutter. Work will be let early in 1913. Theo. S. DeLay, Civil Engineer.

Auburn, Ind.—A representative body of Auburn citizens have waited on directors of Commercial Club with good roads proposition, intended to awaken interest in movement in DeKalb County, and as result it was voted to put up \$2,500 in prizes for best built roads in 1913. Township Trustees and Supervisors are eligible to enter contest.

Indianapolis, Ind.—Resolutions have been adopted for improvement of various streets.

Topeka, Kan.—Resolutions have been adopted for improvement of various streets.

Topeka, Kan.—Resolutions have been passed for improving of Lincoln and Lane sts.

Louisville, Ky.—Working specifications based on new asphalt ordinance will be ready for use by middle of January. City Engineer David R. Lyman will shortly arrange to advertise for bids on bulk of spring and summer asphalt paving so that coming of spring work can start without delay. Working specifications for asphalt describe grading, curbing, foundation and three types of top surface and binder now allowed under new asphalt ordinance. These three classes are as follows: Class A—A 2-in. top surface and 1½-in. binder to be laid upon a 6-in. concrete foundation on streets where the traffic is heavy. Class B—A 2-in. top surface and 1-in. binder laid upon 5-in. concrete foundation to be laid on streets where the traffic is exceptionally light because it is not through thoroughfare, principal traffic being light delivery wagons. Ninety per cent. of contracts will be let under Class B.

Baltimore, Md.—City will advertise about first week of January for bids, which bids will be received about third week in January, for approximately half a million dollars of paved streets. These streets will consist of sheet asphalt, bituminous macadam, granite block, vitrified block and bituminous concrete, all to be placed practically on 6-in. concrete base. These streets will be divided into contracts ranging from \$50,000 to \$125,000. H. K. McCoy, Chief Engineer.

Baltimore, Md.—With completion of Thirty-third st. parkway, on which work will start early next year, Baltimore will have been surrounded by chain of parks and parkways extending from Carroll to Patterson Parks. An ordinance increasing width of Thirty-third st., between Charles st. and Hillen road, from regulation-sized city street of 66 ft. to 120 ft., was passed several years ago. Appropriation of \$50,000 for this purpose was made to that board in the 1913 ordinance of estimates, and, according to members of Commission for Opening Streets and Park Board, work on street will start as soon after first of year as possible.

Lawrence, Mass.—New bids for proposed river boulevard running from end of Water st. to join terminal of present Lawrence-Lowell boulevard on Lowell road, near Stanley's resort will be called by Essex County Commission. Route or new highway is along north bank of Merrimack River, through Glen Forest Park, Barker's Grove.

Grand Rapids, Mich.—Council has authorized Mayor and City Clerk to sell \$225,000 street improvement bonds and \$75,000 in sewer construction bonds.

Grand Rapids, Mich.—Bids will be received by City Clerk up to 3 p. m., January 6, 1913, for \$180,000 street improvement bonds. James Schriver, City Clerk.

Duluth, Minn.—Paving of First st., between 20th and 30th aves. is now assured. It will connect 21st ave. paving with Grand ave. and Vernon st., paving of latter now being assured by another petition.

Chillicothe, Mo.—City Engineer Jo Broadus has been instructed by City Council to prepare plans and specifications and estimates of paving of Jackson st., from Washington to Dickenson and Cooper st. which begins at Walnut and ends at Dickenson. Paving is to be of cement, same as used by Ratcliff-Gibson Co., which is putting in Hassam paving on East Webster st.

Atlantic City, N. J.—Condemnation proceedings to secure full widening of Ventnor ave. will be pushed by Commissioner Thompson, under authorization given him two weeks ago by Commissioners.

Atlantic City, N. J.—Commissioner Bachrach, Director of Public Works, has announced that he had given orders for plans to be drawn for improvement of city land at Albany ave. along lines suggested by Commissioner Thompson, who thinks that Atlantic ave. should be cut straight through the plot.

Belvidere, N. J.—Board of Freeholders of Warren County has approved plan to drain Great Meadows, in upper section of county, at estimated cost of \$500,000. Each year about \$27,000 is to be expended on contract until it is completed.

Collingswood, N. J.—The Mt. Ephraim pike will be paved with concrete from Bellmawr to Camden city line, at Collingswood, distance of nearly 4 miles, according to Freeholder Howard L. Merrick, of Collingswood.

Jersey City, N. J.—Improvement of Rose ave. has been planned. E. B. See, Clerk.

Auburn, N. Y.—Share in \$50,000,000 good roads construction in state has been assured each town in Cayuga county by virtue of resolution passed by Board of Supervisors.

Brooklyn, N. Y.—Flatbush ave. extension will be paved next spring, according to present plans of Public Works Commissioner Lewis H. Pounds and Borough President Alfred E. Steers.

Brooklyn, N. Y.—Elmhurst ave., Elmhurst, is to be widened from Broadway to Roosevelt ave., distance of three-quarters of a mile. Ten feet will be taken from each side of the avenue.

Brooklyn, N. Y.—Widening of Fresh Pond road is being planned.

Fulton, N. Y.—According to report of W. B. Reed, Superintendent of the Sixth Highway District, town of Volney, will receive \$1,540 from the state as its apportionment for cost and upkeep of its county roads. This sum is estimated on basis of from 50 cts. to \$1 on every dollar raised in towns for highway purposes. Granby as a town will receive \$1,400.

Lockport, N. Y.—Aldermen have approved of petitions for brick paving on Richmond ave. and one for asphalt on Oliver st.

Oswego, N. Y.—Supervisor V. D. Pierce of Albion has presented petition for building of new highway through town of Albion. Matter was referred to Highway Committee.

Rochester, N. Y.—Approximately \$2,000,000 will be apportioned to Monroe County under state \$50,000,000 good roads' bonding act, according to statistics of County Engineer J. Y. McClinck, who figures that all told about 204 miles of road will be completed. These are first roads to be built: West Henrietta-West Rush, 7.36 miles; Little Ridge, Part 5, 3.83 miles; Pittsford-Palmira, 5.90 miles. Following are the county highways, the order of construction to be designated by the local Supervisors as soon as present lists are exhausted: West Greece-Manitow Point, 9 miles; Hamlin-Morton Road, 1.75 miles; Elmwood ave. road, 6.5 miles; Fairport village, 1 mile; Honeoye Falls village, 1 mile. Total, 19.25 miles. Other roads will be built as follows: L'ell ave.-Spencerport-Brockport to county line, 19 miles; Fairport to county line, 3 miles; Mendon Center to county line south, 1.3 miles. Total, 25.55 miles.

Rome, N. Y.—Public hearing has been held on matter of improving North and South James st., Mill and East Whitesboro sts., to connect city pavements with state improved roads. State provides for 15-ft. roadway, and it is proposed to have 30-ft. roadway, property owners on either side paying difference from a 16 to a 30-ft. road. There was no legal objection to proposed improvement.

Saratoga, N. Y.—John E. Hodgman, County Superintendent of Highways, has received from State Highway Department maps for improved highway in town of Clifton Park. New highway extends from Rexford bridge north through Rexford and east to Wits Corners. Also from four corners of Rexford to Grooms Corners, distance of 6.12 miles. Contract for this highway will probably be let in January or February.

Saratoga Springs, N. Y.—Board of Trustees and Sewer, Water and Street Commissioner have held special joint meeting to take action on proposition to have certain streets in village improved by state and county authorities. Resolution was adopted asking State Highway Commission to build as county highway that portion of village streets beginning at top of Empire hill, running to east line of Maple ave., down Geneva st. to the Red spring at Spring st. and out Spring st. to east corporation line of village, beyond pumping station. These streets are to be of bituminous macadam. Geneva st. is to be 19 ft. wide and Spring st., from the Red spring east, is to be 16 ft. wide. These streets will be improved at expense of county and state, excepting additional 3 ft. in Geneva st., which will be paid by village.

Syracuse, N. Y.—Several ordinances offered by Alderman Charles A. Wolfarth declaring intention to order pavements in the Third ward have been adopted. They are in Pond st., from Lodi to Spring st., in Ash st., from the Oswego Canal to Lodi st., in Townsend st., from Butternut st. to Isabella st., and in Catawba st., from Townsend st. to Lodi st. Similar ordinance for paving Madison st., from Montgomery st. to Almond st., was offered by Alderman John H. Bedford and adopted.

Massillon, O.—Final action has been taken authorizing establishment of county road, extending west from No. 2632 South Erie st., near gravel pit, to Pigeon Run road, west of southern extension of Jarvis ave. A steel viaduct 760 ft. in length, which will cost between \$25,000 and \$30,000 will be erected to carry this road over the canal, the river, and the B. & O. and the W. & L. E. railroad tracks. Approach to this bridge from Erie st. will be constructed by city and will be maintained as city street. That part of road which extends west of steel viaduct will be constructed by township officials and will probably be started next spring.

Okmulgee, Okla.—City will let contracts for improvement of Street Improvement District No. 3 on January 3, 1913. District will comprise about 10,000 yds. and will be bituminous concrete paving on 4-in. concrete base. Plans, specifications and bidders' sheets can be obtained from L. H. D. Cook, Com'r of Finance.

Youngstown, O.—Bids will be received at 2 p. m., Jan. 20, at office of City Auditor, for street grading bonds.

Oklahoma City, Okla.—Three counties are contesting for 50 miles of road which Federal Government has promised to help finance as soon as located and local authorities supplement the appropriation. Government has offered to donate \$10,000 toward cost of road, conditional upon its being located on post road and raising of \$20,000 by State and local authorities. Tulsa, Oklahoma and Muskogee Counties have announced their intention to get into competition. Tulsa Commercial Club has wired State Highway Department that it will guarantee \$20,000, providing road is located in that county. Department probably will wait for legislative action before locating the road.

York, Pa.—Beginning of great boulevard to encircle entire city is contemplated in ordinance to be introduced before City Council for construction of parkway a half mile in extent, embracing sweep from north to south about Farquahar Park. Parkway would extend from North George st. and connect with Madison ave.

Chattanooga, Tenn.—Sealed bids at or above par will be received at the Mayor's office until 10 a. m., Jan. 7, 1913, for paving district bonds as follows: Bonds to the amount of \$2,483.36 for Paving Dist. No. 113, and bonds to amount of \$4,121.24 for Paving Dist. No. 156. T. C. Thompson, Mayor.

Chattanooga, Tenn.—Bonds totaling \$15,636.44, which were sold recently to First National Bank, of Cleveland, O., for highest premium yet received, have been signed by Auditor Beaver and Mayor Thompson. The bonds have been issued for Paving District No. 1, Chamberlain ave., and paving District 66, Palmetto st., between Vine and Harrison ave.

Beaumont, Tex.—City Secretary has been instructed to advertise for bids for paving Washington st., between Pearl and Orleans.

Beaumont, Tex.—Petitions have been presented and referred to Board of Public Works asking for paving on Willow st., formerly Keith, from Calder to North st., and on North st., from Willow to Magnolia. Also for paving on Ewing, from Broadway to Liberty.

Corpus Christi, Tex.—At meeting of General Committee it was decided to ask County Commissioners' Court to call election for bond issue of \$425,000 for improvement of county roads.

El Paso, Tex.—City Council has ordered paving of Mesa ave., from River to Blacker st.

El Paso, Tex.—City Clerk has been instructed to advertise for bids on paving of Arizona st., from Golden Hill Terrace to Hutton st.

Fort Worth, Tex.—Petition signed by number of prominent citizens has been presented to County Commissioners asking for change of routing of Cardinal road leading northward to Denton County.

Fort Worth, Tex.—In expending \$1,000,000 on new roads during 1913 Tarrant County Commissioners hope by procuring co-operation of surrounding counties to bring about construction of improved highways to other county seats to connect directly with main roads leading out of Fort Worth to boundaries of Tarrant. Cost of the new Tarrant County roads will be about \$5,000 per mile. Engineers are already at work on system, compiling field notes.

Marshall, Tex.—Contract for paving West Burleso st. will be let Dec. 31.

Paris, Tex.—City Council has awarded contract for paving Bonham st., from Frisco tracks west to city limits, paving to cost \$35,229 and to be of rock asphalt.

Plainville, Tex.—The recent city election in which \$12,000 street improvement bonds and \$10,000 sewer extension bonds were voted almost unanimously, has been declared by Attorney General to be null and void on account of failure of Aldermen to sign certain papers. Mayor Dorsett announces that City Council will order another election at once.

San Antonio, Tex.—The last mile in Bexar County along Frio road has been selected for the model or demonstration road that is to be constructed under direction of George D. Marshall, United States Highway Engineer, who was assigned by Agricultural Department to come to Bexar County to do all in his power for improvement of county roads.

Brighton City, Utah.—County Commissioners have considered numerous petitions and requests for new roads to many districts of county.

Seattle, Wash.—Ordinance has been adopted providing for laying out, extending, widening, altering and establishing of Avalon Way, between Thirty-fifth ave. Southwest and Thirty-sixth ave. Southwest.

Spokane, Wash.—Committee on Street Improvement has reported in favor of paving Market st. After interviewing majority of abutting property owners they found that all were in favor of improving the street, either with paving or macadam. Petitions will be drawn up and circulated, and presented to City Council, as soon as possible. It is proposed to use asphaltic oil-bound macadam full width of street from South ave. to Sanson, and to make balance of street 24 ft. wide.

Fort William, Ont., Can.—Party of surveyors are surveying a route for the international highway, to be built from Fort William to Duluth. Active steps are being taken by St. Louis, Lake and Cook County people to make possible building of proposed international highway. It is proposed to connect road already built from Duluth to Two Harbors with road through Lake and Cook Counties to connect at border with road to be built from Port Arthur and Fort William by Canadian government. Cook County expects to issue bonds to defray cost of portion of road running from Lake County to border.

CONTRACTS AWARDED.

Vernon, Ala.—By State Engineer Montgomery, contract for 4 miles of grading of proposed Sulligent and Vernon roads, to W. A. Hicks & Son for \$8,000.

Elmhurst, Cal.—To Henry Davis, of Oak Park, for grading of streets, laying cement sidewalks and installation of curbs and gutters at \$33,000.

Casey, Ill.—By Board of Local Improvements, contract to J. W. Etchison for vitrified brick paving and concrete curb and gutter, asphalt filler. Cost, \$13,600.

Elgin, Ill.—By Board of Local Improvements to Logan & Gierz Construction Co., city, at \$34,497.44, for paving portion of Charles st.

Elkhart, Ind.—Following contracts have been let for street improvements: Oakland ave., asphalt paving, Andrews Asphalt Construction Co., Hamilton, O., \$7,947; Park and S. 3d sts., Cassopolis st., brick paving, and Elkhart ave., Northern Construction Co., 214 S. Main st., Elkhart, \$8,520.15, \$4,025.60 and \$16,942, respectively.

Indianapolis, Ind.—By Board of Public Works, to L. J. Cooper for improvement of New Jersey st., from Thirty-eighth st. to Fortieth st.

La Fayette, Ind.—By Board of Public Works, to Wm. M. Jackson for cement sidewalks on Seventeenth st., from Greenwich to Stillwell st.

Pikeville, Ky.—By City Council to Kelly Bros., Portsmouth, O., for 25,000 sq. yds. street paving.

Salisbury, Mass.—For construction of boulevard from Salisbury to New Hampshire State line, about four miles, to David Watkins, Amesbury, at \$12,000.

Oxford, Miss.—By Lafayette County Commissioners, to E. W. Jordan, of Birmingham, Ala., at about \$100,000, to construct 25 miles of road, about 15 miles to be surfaced with gravel macadam.

Brooklyn, N. Y.—Bids have been opened at Queens Borough Hall for street signs, paving and sidewalk undertakings, and for furnishing 3 road rollers, lowest bids for which aggregated \$101,811.50. Lowest bids and bidders are as follows: For furnishing and putting in place new street signs and posts, directed, John N. Earl, \$3,575. For grading and laying sidewalks in Jackson ave., from Junction ave. to Fifty-fourth st., Corona, Hastings Paving Co., \$17,446.50. For paving with asphalt block on a concrete foundation, Radde st., from Payntar ave. to Webster ave., Long Island City, Hastings Paving Co., \$14,834. For grading, curbing, flagging and paving with asphalt block on concrete foundation, Boulevard, Long Island City, from Webster ave. to Washington ave., Hastings Paving Co., \$8,926. For paving with improved granite blocks on concrete foundation, Cypress ave., from Myrtle ave. to Cooper st., Evergreen, J. F. Claner, \$44,670. For paving with asphalt on concrete foundation, Prospect st., from Payntar ave. to Beebe ave., Long Island City, Hastings Paving Co., \$6,375. For 3 10-ton steam rollers, Kelly Springfield Road Roller Co., \$5,985.

Syracuse, N. Y.—Bids for two paving contracts have been received by Board of Contract and Supply. On asphalt no proposals were made except under ten-year guaranty provision. In each case bids were for uniform pavement on sides and centre of streets and stone curbing. Proposals were as follows: Almond st., East Jefferson st. to Cedar st.; F. J. Baker, vitrified block, \$2,460.10; asphalt, \$2,336. G. B. Dickison, vitrified block, \$2,479.50; asphalt, \$2,366.10. Warner-Quinlan Asphalt Co., vitrified block, \$2,490.50; asphalt, \$2,359.10. North Franklin st., N. on st. to the Erie Canal; Warner-Quinlan Asphalt Co., vitrified block, \$10,705.10; asphalt, \$10,471.10. G. B. Dickison, vitrified block, \$10,765.60; asphalt, \$10,207.60. F. J. Baker, vitrified block, \$10,583.30; asphalt, \$10,056.30. C. T. Hookway, sandstone block, \$14,126; vitrified brick or block, \$11,026.

Columbus, O.—By Highway Commissioner James R. Marker, three contracts for road construction. Hamilton County gets Bridgetown and Ferguson road, 1½ miles in length, and constructed of the best brick. The contract went to Tepper & Son, of Peru, Ind., for \$27,680. The other contracts are: Auglaize County, Wapakoneta and St. John roads, 4½ miles, waterbound macadam, to Louis Pickering, Bellefontaine, O., \$13,500; Wyandot County, Upper Sandusky and Findlay road, 2.65 miles, waterbound macadam, to National Lime & Stone Co., Carey, O., \$12,495.

Youngstown, O.—Contracts amounting to about \$16,000 have been let to Cleveland Trinidad Paving Co. for asphalt concrete paving in Wick park. All drives in this pretty park will be paved and work to be started in early spring. Number of walks will also be sidewalked. New drive will be opened next year running from west side of the tract to Elm st.

Rochester, Pa.—For grading and paving Vermont ave., from Washington Clay st. to George B. Clifford, Martins Ferry, Ohio, at \$10,640.

Denison, Tex.—By city, to Murphy-Moulton Co. to pave Mirick ave. with asphalt macadam, including curbing and guttering, 22,000 sq. yds.

Galveston, Tex.—Board has received, opened and referred to Commissioner Austin and City Engineer Dicker for tabulation and report five bids sent in for contract of putting in vitrified brick pavements and other improvements on streets about new Santa Fe depot. Bids received with various bids upon different sections of work are as follows: A. G. Falligan—(4) \$1.25 per sq. yd.; (5) 75c. per lin. ft.; (8) \$6.15 per lin. ft. Ed. Ringh—(4) \$1.30 per sq. yd.; (5) 60c. per lin. ft. Horton & Horton, Houston—(1) \$2.33 per sq. yd.; (2) \$1.80 per sq. yd.; (4) 13½¢ per sq. ft.; (5) 46c. per lin. ft.; (6) 35c. per lin. ft.; (7) 35c. per cu. yd.; (8) \$6.07 per lin. ft.; (4) 10c. per sq. yd.; (9b) 10c. per sq. yd. Creosoted Wood Block Paving Company, New Orleans, La.—(3) \$2.85 per sq. yd.; (6) 30c. per lin. ft.; (7) 50c. per cu. yd.; (8) \$2.60 per sq. yd.; (9c) 15c. per sq. yd. P. J. Vau-

trin—(1) \$2.33 per sq. yd.; (2) \$1.75 per sq. yd.; (3) \$3.35 per sq. yd.; (4) \$1.17 per sq. yd.; (5) 47c. per lin. ft.; (6) 31½¢ per lin. ft.; (7) 40c. per cu. yd.; (8) \$5.94 per lin. ft.; (9a) 6c. per cu. yd.; (9b) 9c. per cu. yd.; (9c) 12c. per cu. yd.; (9c) 12c. per cu. yd. Different units called for in advertisement for bids were something like following: (1) Vitrified brick paving, including 4-in. concrete base, 12-312 sq. yds.; (2) vitrified brick paving, if laid in 3-in. sand base, 12,312 sq. yds.; (3) wooden block paving, including 4-in. concrete base, 12,312 sq. yds.; (4) cement sidewalk, 1,132 sq. yds.; (5) concrete curbing, 2,100 lin. ft.; (6) concrete retaining bulkheads, 1,500 lin. ft.; (7) hauling about 360 cu. yds. of filling from Avenue B, between Eighteenth and Twentieth sts. to the new 40-ft. street between Twenty-fifth and Twenty-eighth sts.; (8) constructing 500 lin. ft. of concrete drain; (9) if the maintenance bond and deposits is waived by the city and the contractor is not required to repair and guarantee the maintenance of the pavement, the contractor agrees to reduce the prices bid for the work. (9a) On all pavement laid with vitrified brick on 4-in. concrete base; (9b) on all vitrified brick pavement laid on 3-in. sand base; (9c) on all pavement laid with wooden blocks on 4-in. concrete base.

Ft. Monroe, Va.—To G. E. Trice & Co., Inc., Hampton, Va., at \$1,156.40 for construction of roads around new non-commissioned officers' quarters, comprising approximately 4,340 sq. ft.

Seattle, Wash.—By Board of Public Works, to F. McLellan, at \$74,722.95, for paving Fifth ave., S. and to William Kopta, at \$29,153.75, for paving Post st. district.

SEWERAGE

Tempe, Ariz.—At meeting of City Council question of new Tempe sewer system was taken up and discussed. City Attorney reported that in his opinion City Council could go ahead and prepare for bond election, purpose of which will be to raise necessary money with which to install the sewer.

Pasadena, Cal.—City Engineer Van Ornum has filed with Council his recommendation for sewer system for South Grand ave. district and his plan has been approved. This idea of ultimately serving low section near Arroyo bank has been under consideration for years. Cost to district will be between \$17,000 and \$18,000, and city will pay for installing pumping plant to raise sewage 80 ft., to level outfall sewer. This will cost city not to exceed \$2,000.

Topeka, Kan.—Petitions have been received for construction of sewers on various streets.

Boston, Mass.—The building of half-million dollar intercepting sewer is suggested by William S. McNary, chairman of harbor and land commission, as best possible means of remedying pollution to which waters of Dorchester bay are now subjected because of sewage or other causes.

Grand Rapids, Mich.—Bids will be received by City Clerk up to 3 p. m., January 6, 1913, for \$60,000 sewer construction bonds. James Schriver, City Clerk.

Grand Rapids, Mich.—Council has authorized Mayor and City Clerk to sell \$75,000 bonds for sewer construction.

Duluth, Minn.—Construction of sanitary sewer from intersection of Kenilworth ave. at Sussex ave. to easterly end of Kenilworth ave. at Livingston ave., and from Sussex ave. at Kenilworth ave. to Sussex ave. at Snively road, has been petitioned for.

Scotts Bluff, Neb.—City Engineer has been directed to prepare estimates of cost for completing main sewer system. Board will shortly call for bids for its construction.

Perth Amboy, N. J.—Ordinance has been adopted for construction of 15-in. pipe sewer in Brodhead place between Sayre ave. and New Brunswick ave.

Livingston, N. C.—Bond issue of \$15,000 will be voted on in January for construction of sewerage and waterworks systems.

Dayton, O.—Sanitary sewer bonds, 5 per cent., for District No. 4, have been sold by City Auditor Bish in sum of \$12,000 to A. E. Aub & Co., of Cincinnati, at premium of \$735.60.

Youngstown, O.—Bids will be received at 2 p. m., January 20 at office of city auditor for sewer bonds.

Hazleton, Pa.—It has been decided to receive bids for work of connecting Borough Building with Fourth st. sewer.

Jenkinstown, Pa.—With almost 450 votes cast at special election on question of bonding borough for \$75,000 to construct modern sewerage system, loan bill was approved by majority of 36 votes.

Sioux Falls, S. D.—City Council has approved of plans for lateral sanitary sewer in District No. 2; also for similar sewers in District No. 2 and in District No. 3.

Cuero, Tex.—City Council and mass meeting of citizens discussing steps for extension of Cuero sewer system additional to that provided for by recent issue of \$25,000 worth of bonds, which work is now about completed.

Dallas, Tex.—Water Commissioner Nelms will recommend that bids be asked for building of sewers in Juliette st. from Leonard to Allen, and in Flora, Houston and Texas Central to Wade, and Wade to Houston and Texas Central again, these to serve total of 154 houses.

Dallas, Tex.—At meeting of Board of Municipal Commissioners bids were opened for construction of storm sewer in Fourth ave., from Grand ave. to Peake Springs, and referred to Commissioner Lee.

Paris, Tex.—The City Council has awarded contract to Oklahoma City parties for extension of sanitary sewers to serve eastern portion of city. Extension will cost approximately \$10,000.

Temple, Tex.—City Council has opened bids from engineering firms for services to be performed in estimating value of present plant of Temple Sanitary Sewer Co., for purchase of which city is negotiating and also to furnish estimates for entirely new plant in event purchase should not be made. Six engineering firms submitted propositions, which will be considered and acted upon at first council session to be held in January. Following bids were submitted: McComb Engineering Co., Waco, basis of actual expenditure and per diem; Ehler Engineering Co., La Grange, \$2,200; Worley & Black, Kansas City, \$2,675; Myers & Noyles, Dallas, \$1,450; Burns & McDonald, Kansas City, \$950; Bartlett & Ranney, San Antonio, \$1,500.

North Yakima, Wash.—N. A. Gillan, City Engineer, has submitted to City Commission plans for complete sewer system to cost \$274,000.

Bangor, Wis.—All difficulties in way of placing sewer system in street, as ordered by people in last election, have now been overcome and work will be started.

Bangor, Wis.—Village Council has sold the \$14,000 sewer bond issue to La Crosse State Bank for \$14,073.

Cody, Wyo.—Town Council is considering sewer system. Engineers will make an estimate of cost.

CONTRACTS AWARDED.

Washington, D. C.—By Superintendent of Sewers, contracts for sewers as follows: To W. F. Brenzer Co., Washington, for sewers in Broad Branch Valley and Military road, between Piney Brook road and Rock Creek Park, at \$6,787, and to George Hyman, Washington, for sewer in Military road, from Rock Creek Park and Connecticut ave., \$4,538.

Jacksonville, Fla.—Florida Machine Works, of this city, was successful bidder for furnishing 850 manhole frames and covers. Bid was \$14.77 each for design "A" and \$15.05 each for design "B."

Pensacola, Fla.—To construct sanitary sewers in various streets, to Wicke Bros., Pensacola, at 40 cts. per ft. for 8-in. terra cotta pipe, and \$33 each for manholes.

Springfield, Ill.—Board of Local Improvements to Geo. A. Carver, city, for an 18-in. crook pipe sewer in Sixteenth st., from Laurel st. to alley south of S. Grand ave.

New Richmond, Ind.—To Maxwell & Jordan, at \$8,200, for construction of 23,000 lin. ft. 24-in. drain tile ditch, near New Richmond.

Louisville, Ky.—For sewer construction in Twenty-third and Thirty-second sts., to James Ferry & Sons, 38 Hawthorne ave., Pittsburgh, Penn., at about \$80,000.

Baltimore, Md.—A meeting of Sewerage Commission called to make recommendations on three sewerage contracts which were afterward approved by Board of Awards. First of contracts, Sanitary Sewerage Contract No. 106, went to William McCarthy Co., lowest bidder, at \$37,834.25. Storm Water Sewer Contract No. 24 was awarded B. F. Sweeten & Sons at \$166,194. Contract for cement mixer for City Engineer's Department was awarded to Municipal En-

gineering Construction Co. at its bid of \$1,572.

Canton, O.—For sanitary sewers in various streets following are low bidders: John Skeeles, 201 East Tenth st., was low bidder on Brown ave., Erie and Bay sts., at \$1,091, Prescott ave., at \$1,672.60, Bank st., at \$900; John P. Jones, 213 Bedford ave., low bidder on Grant st., at \$1,230.20; Geo. W. Luke, 122 Kensington ct., low bidder on Winfield ave., at \$1,117, and on West Third st. and Ralph st., at \$1,775.60.

Hamilton, O.—City Council contracts for sewers, as follows: Sanitary sewers and hose connections in Vine st. and Greenwood ave., John H. Trunch, \$2,289.40; storm sewer in bed of Crawford's run, Frank J. Davis & Sons, \$5,423.90. Frank Weaver is city engr.

Zanesville, O.—By Board of Commissioners of Muskingum county to F. M. Werstall, Zanesville, for sanitary sewer and tank for Muskingum County Children's Home, at Avondale.

Providence, R. I.—By Board of Contract and Supply, contracts for sewer pipes and bricks to William H. Harris. Bids for flagstones have been rejected, as they came under \$500, and were turned over to Commissioner of Public Works.

WATER SUPPLY

Tucson, Ariz.—Estimates are being prepared for water works, to cost \$150,000. W. H. Thompson is City Engineer.

Los Angeles, Cal.—To Finance Committee has been delegated task of finding some way to complete financing of aqueduct project. The report of the Board of Public Works showing condition of aqueduct funds has been presented to Council and sent to committee.

Oakland City, Ind.—Town Council has purchased block of waterworks stock, issued several years ago, to install plant here.

Helle Plaine, Ia.—City Council is considering installing air lift to centrifugal pump and improvements to pumping plant, from plans of Charles P. Chase, of Clinton.

Des Moines, Iowa.—Sixty miles of new water mains are said to be needed.

Osceola, Iowa.—City will vote Dec. 30 on bond issue for additions to water works.

Pisgah, Ia.—Bonds in sum of \$7,000 have been voted for construction of waterworks system.

Readlyn, Iowa.—Town will vote on constructing water works in January.

Valley Junction, Ia.—Charles P. Chase, of Iowa Eng. Co., of Clinton, will confer with city as to advisability of installing water works and electric light plant.

Kingman, Kan.—Bonds in sum of \$45,000 have been voted for purchase of local water and light plant.

Wellington, Kan.—Bond election for \$200,000 for water works has been called off pending further prospecting for water. A. B. Cheever is City Clerk.

Grand Rapids, Mich.—Waterworks extension bonds to amount of \$100,000, authorized last spring and ordered sold by Council, have been bid in by W. R. Bond and Mortgage Co., of St. Louis.

Virginia, Minn.—Virginia can take over water and light plant, proposed bond issue having been ratified by voters. It is expected city will take over and operate the plant April 1. Price to be paid is \$492,000 plus value of recent improvements which may increase price to near \$550,000.

Diller, Neb.—Special election will be held on issuing bonds to complete water plant.

Elizabeth, N. J.—Installation of meter has been recommended.

Woodbury, N. J.—The Woodbury Council has extended contract for supplying Woodbury Heights with water from December 31 to June 30, on same basis of pay.

Broadalbin, N. Y.—Construction of waterworks system is being considered.

Brockport, N. Y.—State Conservation Commission has granted petition of village of Brockport for approval of plans to acquire new source of water supply and to construct new water-works system with certain modifications of plans as designated by commission. Project is for installation of municipally owned water supply system, source Lake Ontario, 14 miles distant from the village, water to be led into slow sand filter, and thence pumped from village by two pumping units of 750,000 gallons per day capacity each. South of village there will be constructed a distributing reservoir of 1,500,000 gallons capacity, flow

line of which will be 160 ft. above center of village. Estimated cost is \$275,000. Municipal mains parallel mains of Brockport Holley Water Co. Village of Albion's application for water supply from two driven wells on Marshall farm two miles south of the village has been approved. Estimated cost is \$130,000. Water will be filtered and aerated. Municipal waterworks system will parallel mains of Albion Waterworks Co.

Le Roy, N. Y.—Corps of surveyors of State Conservation Commission are now surveying line between Batavia and Le Roy for proposed pipe line to lead from reservoir that Conservation Commission hopes to construct at Linden to furnish water to towns and villages of Western New York.

Port Washington, N. Y.—Village is considering purchase of local plant or of establishing municipal system.

White Plains, N. Y.—Notice is hereby given that sealed proposals will be received by Board of Trustees of village at the Corporation Rooms on Grand st., until 8 o'clock P. M., Jan. 14, 1913, for purchase of \$8,000 water bonds of the Village of White Plains, New York.

Lillington, N. C.—Bond issue of \$15,000 will be voted on in January for construction of waterworks and sewerage systems.

Clyde, O.—Plans will be prepared by Moore Engineering Co., of Cleveland, O., for proposed waterworks system.

Youngstown, O.—Council has passed legislation for \$72,200 for New Tod engine for waterworks.

Pawtucket, R. I.—In accordance with plan inaugurated by joint standing committee on finance, providing for issue of bonds to cover expense of future municipal improvements, a sale of \$175,000 water construction bonds has been made.

Canova, S. D.—Installation of waterworks system is being discussed.

Ganblin, S. D.—City Commissioners have handed back all bids on construction of new waterworks system. Engineering firm of Edmunds & Morgen had prepared plans specifying only wooden mains, but new bids will now be called for Jan. 26 on wooden and iron mains.

Beaumont, Tex.—Council has named committee to examine into municipal water works proposition.

Montgomery, Tex.—Town has voted \$10,000 in bonds for waterworks system.

North Bennington, Vt.—Waterworks system will probably be installed to cost \$140,000.

Centralia, Wash.—Bonds have been voted for \$300,000 for installing water plant and gravity supply system.

CONTRACTS AWARDED.

McGehee, Ark.—For constructing water works and electric light plant, from plans of Missouri Valley Eng. Co., of Mitchell, S. D., to T. C. Brooks & Sons, of Jackson, Mich., for \$23,639.

Kansas City, Kan.—To Dravo Doyte Co., Pittsburgh, Pa., contract for centrifugal pump of 15,000,000 gals. daily capacity, at \$7,335.

Trenton, N. J.—For construction of new filtration plant, to J. S. Rogers Co., of Moorestown, at \$329,000.

Hot Springs, N. D.—For steel water tank, to Flaig & Troy, Sioux City, Ia., \$3,793. Other bids follow: Kennicott Co., Chicago, Ill., \$3,592; Chicago Bridge & Iron Works Co., Chicago, Ill., \$4,100; Minneapolis Steel & Machinery Co., Minneapolis, Minn., \$4,197; Des Moines Bridge & Iron Works, Des Moines, Ia., \$3,400 and \$3,800; Rock Island Bridge & Iron Works, Rock Island, Ill., \$4,332.

Cleveland, O.—For valves for fire service pipe system by Director of Public Service, to Rensselaer Valve Co., Troy, N. Y., \$2,638. Other bids as follows: The Darling Pump & Mfg. Co., Williamsport, Pa., \$3,045.75; Roe-Stephens Mfg. Co., Detroit, Mich., \$3,629; Pittsburgh Valve Foundry & Const. Co., Pittsburgh, Pa., \$4,517; Chapman Valve Mfg. Co., Indian Orchard, Mass., \$4,723; The Ludlow Valve Mfg. Co., Troy, N. Y., \$4,880; Coffin Valve Co., Boston, Mass., \$5,549.

Portsmouth, O.—For installation of filtration plant by Board of Control, to New York Continental Jewell Filtration Co., \$124,378. Other bids as follows: Norwood Engineering Co., \$134,060; Pittsburgh Filter Mfg. Co., \$128,235.

Toledo, Ohio.—To A. Bentley & Sons, contract for remodeling and enlarging water works pumping station on Broadway for \$26,445, lowest bid. Four other contractors bid as follows: H. J. Streiker, \$27,114; Beers-Offutt Construction Co., of Grand Rapids, Mich., \$27,830; J. L. Le Duke & Co., \$30,390, and Thomas Moylan, \$34,990. The successful bidder will enlarge one side of building to house new 15,000,000 gallon pump and heavy traveling crane. Board also awarded contract for pumping equipment to drain North Toledo marsh to Power Equipment Co., at its low bid of \$9,506.

Enfauila, Okla.—By City to Nick Peay Construction Co., of Little Rock, Ark., at about \$125,000, to construct water-works and sewer system.

Ponca, Okla.—To Charles Halstead, Breckenridge, Mo., contract, at \$5,945, for waterworks improvements for Ponca.

Hot Springs, S. D.—To construct steel water tank, complete, including concrete foundation and tower, at Battle Mountain Sanitarium, to Flaig & Lang, Sioux City, Iowa.

Galveston, Tex.—Contract for furnishing waterworks department with fuel oil for one year was awarded to Gulf Pipe Line Co., price being for oil not less than 26 gravity, barrels of 42 gallons, \$1.37 per barrel at Alta Loma and \$1.20 per barrel at Galveston. Total amount involved in awarding of contract approximated \$28,000.

Fairmount, W. Va.—By city, contract to Epping-Carpenter Co., of Pittsburgh, Pa., for 4,000,000 gal. horizontal cross-compound Corliss high-duty pumping engine for water works.

LIGHTING AND POWER

Los Angeles, Cal.—Seventh st., between Hoover and Alameda sts., is to be ornamented with boulevard electrolights of type used on Broadway and Spring st. Cost of installation of electrolights will be but \$1 a lin. ft. and cost of maintenance 60 cts. per ft. per year.

Los Angeles, Cal.—Authority to advertise for 750 more arc lights to illuminate city's streets has been granted Board of Public Works by City Council. Lighting contract expires Dec. 31 and bids will have to be received within few days to enable Board to enter into contract by time the old one expires. Budget provides for 500 additional arc lights to be installed during present fiscal year, but Gas and Light Committee wants 250 more than that number installed after July, when next fiscal year begins.

Pomona, Cal.—At meeting of Council ordinance was passed extending electric lighting system on several of principal streets to cover districts built up in extending residence sections. Lights will be put along White and Towne aves., Fourth, Ninth and Alvarado sts. and Huntington boulevard.

Denver, Col.—Between \$20,000 and \$30,000 will be expended after first of year in improving lighting system along Eighteenth st., from Broadway to Union Depot. Agreement to this effect has been reached by Tramway Co., city, and property owners.

Hartford, Conn.—System of street lighting similar to that on Asylum ave. is assured to central zone of city by action of Common Council.

Batavia, Ill.—City Council is considering purchase of new engine for municipal electric light plant, to cost about \$7,000.

Preston, Iowa.—The \$8,000 bond issue for an electric light system has been carried.

Garden City, Kan.—Citizens have voted to issue \$40,000 bonds for electric light plant. J. F. Crocker is City Clerk.

Herington, Kan.—Extensions are planned to municipal electric light plant within next few months. George F. Brockman is Superintendent.

Eminence, Ky.—At meeting of City Council ordinance providing for sale of franchise to lighting company was passed. A representative of Kentucky Utilities Co. was present and announced that he would be bidder when franchise is offered for sale.

Lawrence, Mass.—New lighting contract is being discussed.

Albion, Mich.—Committee appointed recently by Mayor McCarty to investigate local street lighting conditions has quietly secured options on two excellent sites for power plants, and prospect of municipally owning electric lighting plant is causing much talk about city.

Lake City, Minn.—Preliminary plans for reconstruction of electric light and water plant have been submitted. Chas. P. Chase is Consulting Engineer, Clinton, Iowa.

Northfield, Minn.—Ornamental street lights are proposed for next year.

Salem, O.—Cost for lighting of new system has been figured out by Mr. Hinsdale of Lighting Committee of Council for benefit of general public. There being 365 days in a year, cost for entire year would be 365 times \$9.63, which would be \$3,533.20 for total cost of current for year. Lamps are likely to require two renewals a year, and there being 300 lamps, this would make renewal of 1,600 lamps per year. Approximately cost of lamps are 90 cts., and for 1,600 lamps it would be \$4,440 per year for lamps. Attendance is uncertain, but figuring this at \$600 per year gives following cost of entire system for the year: Current, \$353.20; renewals, \$1,440; attendance, \$600, or a total of \$5,573.20. City has been paying \$10,500 for old system and taking cost of new system, \$5,573.20, from the cost of old system, \$10,500, it leaves \$4,926.80, saving to city over old system.

Sharon, Pa.—City Council has decided to erect municipal electric light plant. Estimated cost \$85,000.

Somerset, Pa.—Somerset Council has passed ordinance granting to People's Natural Gas Co., of Pittsburgh, franchise to lay pipes within borough for purpose of supplying gas for lighting, heating and for fuel.

Corpus Christi, Tex.—Voters have voted favorably on proposition to grant Charles C. Bruce, of Philadelphia, right to construct and maintain gas plant in this city for period of fifty years.

Murray, Utah.—The \$60,000 bond issue put out by this city to obtain funds with which to construct power and light plant at foot of Little Cottonwood Canyon has been purchased by Causey, Foster & Co., of Denver.

Tacoma, Wash.—City Council has ordered several new street lights in various parts of the city.

Deperre, Wis.—City Council has awarded franchise for furnishing fuel and illuminating gas to residents of this city to Green Bay Gas & Electric Co. Four miles of pipe must be laid by Jan. 1, 1914.

CONTRACTS AWARDED.

Akron, O.—Service Director R. M. Pillmore has signed contract with Cleveland Vapor Light Co. for 1,000 lights to be used in street lighting. Rate to be paid is \$14.85 per light per year. Contract is for one year.

Donaldsonville, La.—By Municipal Light and Power Commission, to Deisel Engine Co., the Ft. Wayne Electric Co., and the Lawrence Co., contracts for machinery for municipal power plant, at total of \$41,000.

Mishawaka, Ind.—The Franklin Electric Manufacturing Co., of Hartford, has been awarded contract for next year's supply of incandescent lamps.

Providence, R. I.—By vote of 34 to 3 Common Council has voted to grant to Rhode Island Power Transmission Co. a 20-year franchise under which to do business in this city.

FIRE EQUIPMENT

Colorado Springs, Colo.—Purchase of tractor for ladder truck is being considered.

Waterbury, Conn.—In report Fire Chief repeats his recommendations made in 1910 and 1911 that, during coming year, work will be started on underground service for fire alarm telegraph. He also asked that purchase of automobile pump engine and hose wagon combined be made as soon as possible.

Champaign, Ill.—Purchase of motor apparatus is recommended by Chief John Ely.

Indianapolis, Ind.—Bids will be received by City Controller until 12 m., Jan. 30, 1913, for the whole or any part of \$75,000 fire headquarters and city garage building bonds of 1912. H. R. Wallace, City Controller.

Muscatine, Ia.—Purchase of two pieces of motor apparatus and installation of automatic fire alarm system is being considered.

Holyoke, Mass.—Board of Fire Commissioners has recommended purchase of 2,500 ft. of 2½-in. fire hose and purchase of second hand automobile.

Grand Rapids, Mich.—Engineer W. E. Flickinger, of Detroit, in consultation

with Engineer E. R. Townsend, of Chicago, recommends various changes to local fire department.

St. Paul, Minn.—Fire station at Como is being considered.

Butte, Mont.—Purchase of auto truck is being considered to cost \$20,000.

Dover, N. J.—By unanimous vote of Council bonds have been authorized to be issued in sum not exceeding \$10,000, to be used for purchase of new automobile combination chemical and hose fire apparatus and other necessary equipment at fire headquarters.

Amityville, N. Y.—Purchase of hose has been recommended.

Akron, O.—By ordinance submitted to Council by Councilman Whittemore, Server Pillmore has been asked to receive bids on number of new pieces of motor fire apparatus for Akron's fire department. Ordinance asks that bids be received on apparatus to equip every engine house in city, with motor pumps, self-propelled trucks, etc.

Wellsville, O.—Purchase of motor apparatus is recommended.

Philadelphia, Pa.—Automobile steamer for the Old York Road Fire Company is being considered.

West Chester, Pa.—The Borough Council of West Chester has decided to purchase three motor driven chemical engines, one for each of fire companies here—First West Chester, Good Will and Fame—and of such design as may be approved by Council. Of loan approved by taxpayers for \$60,000, about \$25,000 will be used in purchase of modern fire apparatus.

Aberdeen, S. D.—Bolger, Messer & Williams Co., of Chicago, has purchased the \$100,000 bond issue voted by citizens for erection of new city and fire hall.

Bristol, Tenn.—The Bristol authorities have decided to abandon horses as means of propelling hose wagons in fighting fire. A motor car will be substituted. Kind and class of car to be purchased is now under consideration. It is expected that cost of change will be about \$6,000. Board has authorized Fire Committee to make the purchase.

Provo, Utah.—Purchase of hook and ladder truck is recommended by Chief Joseph W. Loveless.

Salt Lake City, Utah.—A fully equipped modern fire station, it is said, will soon be one of the important additions to the sugar house business centre, immediately adjoining Highland Park. N. J. Hansen, manager of the Granite Lumber Co., has just deeded to the city a strip of land on Twelfth South, east of Eleventh East. It is said to be the intention of city to immediately erect substantial building to be used for fire department.

Ellensburg, Wash.—Purchase of motor fire truck is contemplated.

Janesville, Wis.—Janesville will have auto fire apparatus costing \$5,000, according to action of Council. Several firms are bidding on apparatus, which will be complete in every particular.

Oshkosh, Wis.—Purchase of motor hose wagon is being considered.

CONTRACTS AWARDED.

Jacksonville, Fla.—Board has opened bids for erecting new West Forsyth st. fire station, according to plans by Mark & Shefall, and lowest bid was that of Boykin Contracting Co., \$22,300. Other bids as follows: Chamberlain & Gillespie, \$25,620; O. P. Woodcock, \$26,819; F. W. Long & Co., \$26,960.

Caldwell, Idaho.—To Webb Co., of Allentown, Pa., for one motor combination chemical and hose wagon at \$8,950.

Rochester, N. Y.—Contract for furnishing two automobile runabouts for use of Fire Department, at \$2,000 each, to Mabbett-Bettys Co. The Overland-Rochester Co. was awarded contract for furnishing two gasoline trucks at \$1,040 each for use of water works department.

Casselton, N. D.—By Council for gasoline fire engine to Watrous Engine Works Co., at \$1,650.

Stenbenville, O.—For furnishing motor fire truck to American-La France Fire Engine Co., of Elmira, N. Y., at \$8,500.

Portland, Ore.—Taking the stand that other cities on coast are purchasing cheaper brands of fire hose than is being used by the Portland Fire Department, the Fire Committee of the City Executive Board has decided to purchase 6,000 ft. of medium-priced hose and give it thorough trial to ascertain if it will give as good service as higher priced commodity. Only 2,000 ft. of 2½-in. Keystone hose was ordered from A.

G. Long, of this city, for \$1.10 a ft., the remainder of the awards were made to other companies for cheaper brands, as follows: Eureka Fire Hose Mfg. Co., 2,000 ft. of Helmet brand for 85 cts. a ft.; Goodyear Rubber Co., 1,000 ft. of Columbia brand for 90 cts. a ft.; Nott-Joslyn Co., 2,000 ft. of Goodrich double-jacket brand for 90 cts. a foot; Republic Rubber Co., 1,000 ft. of Invader brand for 88 cts. a ft. The Boston Belting Co. was awarded the contract for furnishing 600 ft. of 1½-in. Imperial brand hose for 60 cts. a ft., and a contract for the same quantity of the small hose of the Amazon brand was awarded to the Gorham-Revere Rubber Co. for 50 cts. a ft.

BRIDGES

Attleboro, Mass.—County Commissioners at Taunton are considering construction of bridge at Washington st., Attleboro.

Grand Island, Neb.—County Commissioners have decided that new steel bridge to cost in neighborhood of \$7,500 should be built across north channel of Platte river on road south of Grand Island, known as Sand Krog road.

Portland, Ore.—City Engineer has plans completed for construction of concrete and steel bridge across Sullivan's Gulch.

Corpus Christi, Tex.—Committee has decided to at once secure competent engineer to estimate cost for construction of causeway across Nueces Bay.

Galveston, Tex.—Engineer has been instructed to prepare specifications for new bridge to replace the Major Peers bridge over Dickinson bayou; estimated cost, \$1,600.

Tacoma, Wash.—City Commissioners are considering construction of \$40,000 steel viaduct over Northern Pacific Railway tracks on S. Tacoma ave., to cost about \$40,000. Plans for the same have been completed by City Engineer.

Tacoma, Wash.—Ordinance has been adopted authorizing Commissioner of Public Works to construct extension of Front st. viaduct, from Fifth st. to Carr st., and appropriating from General Fund the sum of \$6,634 to pay therefor. H. H. Edwards, City Clerk.

Manitowoc, Wis.—City is contemplating expending \$25,000 for lengthening Eighth st. bridge.

CONTRACTS AWARDED.

Denver, Col.—By Board of Public Works, contract for construction of Curtis st. bridge, to R. P. McDonald Construction Co., at \$10,160, to be of reinforced concrete.

St. Augustine, Fla.—The Engineering Construction Co., of Jacksonville, of which Gail Barnard, the well-known engineer, is a member, has been awarded contract for construction of concrete bridge over Oyster Creek in New Augustine by Board of County Commissioners. The winning bid was \$1,195. Contract calls for permanent structure of concrete with concrete floor for roadway.

Galesburg, Ill.—By Board of Commissioners of Knox County, to Decatur Bridge Co., Decatur, at \$4,540, for rehabilitation of bridge at Dahinda, in Persifer Township.

Baltimore, Md.—By Board of Awards, to David M. Andrews Co., for erecting solid masonry arch and retaining walls in Wyman Park, for \$16,150.

Taunton, Mass.—County Commissioners have voted to direct William F. Williams to interview W. H. Ellis, of Boston, the lowest bidder for Acushnet bridge, and ask him to modify specifications and to bring his bid down to about \$25,000. Mr. Ellis's original bid was \$33,647.

Crow Agency, Mont.—To A. T. Bayne & Co., Minneapolis, Minn., contract, at \$7,760, for steel highway bridge across Little Big Horn River, Crow Indian Reservation, Montana.

Tacoma, Wash.—On total bid of \$8,442, G. A. Marsh, a Seattle contractor, has obtained contract to construct 3 rustic bridges on new Tacoma-Stellacom boulevard. Work will begin within 30 days. Marsh entered bid of \$666 for bridge over Fleet Creek, at edge of American Lake Prairie; \$5,569 for Chambers Creek bridge, which is to be long rustic bridge of heavy timber, and \$2,207 for third rustic bridge over Murray Creek, near Fort Stellacom asylum. Other bids received were from W. A. Chamberlain, who bid \$11,998 for three bridges; W. G. Hiatt, \$9,987 for two bridges; Knoll Bros., \$13,929 for three bridges; E. Brainerd, \$9,995 for

three bridges; P. Manson, \$4,600 for two bridges, and C. L. Creelman, \$13,951 for three bridges.

MISCELLANEOUS

Los Angeles, Cal.—City Council will be called on by joint committee of Board of Public Works and Council's Finance Committee to advertise for bids for disposal of city's garbage. It is understood that bidding for disposal will permit contractors of both incinerator and reduction plants to bid and will give city opportunity to choose between two types. Bidders will be asked to figure on disposal of garbage by ton for term of ten years, and also on building of plant to be turned over to city when it shall desire to purchase the same.

Sacramento, Cal.—City Electrician Pearce is working with Commissioner Bliss on matter of installing some police alarm boxes in annexed districts.

San Francisco, Cal.—Only one of five bond proposals, aggregating \$4,150,000, passed at municipal election here. Successful proposition is for bond issue of \$1,700,000 to complete city and county jail, emergency hospital and morgue, to complete city and county hospital, and to erect separate buildings for treatment of tuberculosis and other infectious diseases.

Hartford, Conn.—Recommendation of special committee for appropriation of \$100,000 with which to build contagious hospital will probably be submitted to people to vote upon at spring election.

Jacksonville, Fla.—Bids received for second installment of improved bonds to amount to \$250,000 have been rejected.

Boston, Mass.—Transit Commission will advertise shortly for bids for constructing section B of Dorchester tunnel, which will include station in Summer st. extending from near Washington st. to Arch st.

Lowell, Mass.—At meeting of Municipal Council Commissioner of Finance James E. Donnelly submitted order to borrow \$200,000 for "general lawful municipal purposes."

New Bedford, Mass.—Board has opened bids for 7 notes of \$10,000 each for new district court house for New Bedford. The notes were awarded to Blodgett & Co., of Boston, the highest bidders.

Taunton, Mass.—Chief of Police Danforth has recommended purchase of automobile for his department.

Pascagoula, Miss.—Establishment of public park on railroad land is being discussed.

Duluth, Minn.—Chief Troyer will ask Council to authorize him to purchase new patrol wagon.

Grand Island, Neb.—City Council has instructed Clerk Clifford to advertise for bids for erection of monument to cost about \$4,500.

Trenton, N. J.—Scheme for disposal of the city's garbage has been presented to Commission by H. S. Eckels, of Eckels Utilization Co., who is willing to enter into 4-year contract with city to take all of its garbage, provided city will deliver it to railroad siding or sidings. Mr. Eckels proposes to pay the city \$1 per year for garbage.

Syracuse, N. Y.—Plans for covering Public Market have been approved by Public Market Committee of Common Council, and if adopted by administration, work will be started early next year.

Fosteria, O.—Finance Committee of Council has rejected all bids for \$95,280 bonds, including \$30,000 of park bonds, but one bid having been received for entire issue.

Hamilton, O.—Health Officer Dr. A. L. Smedley is contemplating movement looking to establishment of city abattoir.

Muskogee, Okla.—The \$150,000 park bond issue has been carried by large majority.

Tulsa, Okla.—Collinsville, 20 miles north of Tulsa, will hold special election next month when proposed bond issue of \$40,000 for City Hall, fire station and waterworks extension will be voted upon.

Pittsburgh, Pa.—Plans have been completed by Architects Alden & Harlow for altering the Allegheny County courthouse and jail to conform with new grade of abutting streets. Improvements will cost \$200,000. Bids will be ready January 1, 1913.

Tarentum, Pa.—Borough has decided to erect 3-story municipal building to cost \$25,000.

West Pittston, Pa.—For loan of \$25,000 to make certain town improvements,

statement of indebtedness of West Pittston Borough was filed with the Clerk of the Courts. Present indebtedness of the borough is \$30,500. Money is to be used for defraying expenses of remodeling hose house and town hall, erection of new barn, relaying of sewers, on Exeter st., repairing other sewers, construction of new sewer and improving streets. There are to be 50 bonds having face value of \$500.

Beaumont, Tex.—Plans for municipal abattoir have been presented and referred to Board of Public Works, and bids will be advertised to be received on Jan. 7.

Corpus Christi, Tex.—It has been decided to ask County Commissioners Committee to call election for bond issue of \$125,000 for construction of modern courthouse in this city.

Dallas, Tex.—Board of Municipal Commissioners has accepted offer of Dallas Trust and Savings Bank, through S. J. Hay, president, to purchase the \$525,000 remaining bonds of \$1,025,000 issue ordered by voters at election last spring.

San Antonio, Tex.—Establishment of free baths by City Council in congested Mexican districts has been recommended by Board of Health.

McMechen, W. Va.—City Council has instructed clerk to forward proposition to Attorney General at Charleston for his approval of holding special primary election for purpose of raising levy in order that new city building, jail and council chamber, also fire-fighting apparatus, could be bought.

Spokane, Wash.—City Commissioner D. C. Coates has received authorization from City Council for purchase of another three-ton motor truck to be used in work of street department. Cost of machine was placed at \$3,870 and it is to be equipped with a regulation dump body. Money for it is to be taken from equipment fund of street department.

CONTRACTS AWARDED.

Los Angeles, Cal.—To Snare & Triest, New York contractors, contract to build reinforced-concrete wharf at municipal dock No. 1 by Board of Public Works. Contract calls for construction of concrete wharf 2,600 ft. long and 40 ft. wide, railroad tracks, switches and warehouses. Mill along site of municipal dock No. 1 is also to be made under terms of contract. Bid of Snare & Triest was \$444,777.

Jacksonville, Fla.—Contract for furnishing, complete, three auto trucks for electrical department, has been awarded to International Motor Co., of Philadelphia, whose bid on three 5-ton "Saurer" trucks was \$13,306.26, plus cost of special bodies specified by Board, \$900, making total of \$14,206.26. Bid was presented by Gibbs Gas Engine Co., of this city. Contract for furnishing automobile for use of W. E. Bleo, Superintendent of Underground Construction, was awarded to L. C. Oliver, who agreed to furnish Ford touring car, completely equipped, for \$650.

Indianapolis, Ind.—Contract has been let to Indianapolis Telephone Co. for telephone service in police and fire department for \$2,700.

Lawrenceburg, Ind.—County Commissioners have granted contract to Baringer & Tumulty, of Greensburg, to remodel and install heat, light and water in old Versailles courthouse building. Contract amounted to \$10,461.50.

Des Moines, Ia.—To Woods Lumber Co., of Ankeny, contract to furnish 10 carloads of bridge lumber for use in Polk County in 1913, by Board of Supervisors. Price is \$28.95 per 1,000 ft. Highest bid received was \$30.15. Competitive system thus enabled Polk County to make saving of \$1,270 on 225,000 ft. of lumber needed.

Boston, Mass.—Bids have been opened by Transit Commission on building section 4 of Boylston st. subway, which includes station in Copley sq. The Hugh Nawn Contracting Co. bid \$743,700; Patrick McGovern, \$750,050; Coleman Bros., \$751,100; Coughlan & Sheils Co., \$761,275; W. H. Keyes & Co., \$827,945. Contract will probably go to Nawn company, which is building three other sections of subway, but Commission has not decided definitely.

Duluth, Minn.—For Judicial Ditch No. 3, which will drain 84,000 acres of swamp land lying in several townships in St. Louis and Aitkin Counties, to Butler-Coons Construction Co., of Hibbing, at \$193,103. Contract was let at Aitkin, when bids for work were opened at office of auditor of Aitkin County.